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THE MONIST.

OUR MONISM.

THE PRINCIPLES OF A CONSISTENT, UNITARY WORLD-VIEW.

THE question, What are the essential features of Monism? was brought home to me when I read in the last number of *The Monist* the critical remarks made with reference to the new edition of my "Anthropogeny." I shall here endeavor briefly to draw up the outlines of my conception of the world in a manner which will indicate the most characteristic features of my views. Thus both the agreements with and the divergences from the position editorially upheld in *The Monist* will plainly appear.

As is the case with the majority of philosophical differences, so also in the present instance I find that the divergences which exhibit themselves in our respective unitary conceptions of the world are in part only apparent and in part occasioned by the divergent significances of our fundamental ideas. But this will, perhaps, be made clearer by the following methodically arranged eight theses.

I. MONISM.

Like all general concepts of fundamental scope, that of monism also is liable to different definitions and divergent modifications,—the natural result of individual differences of subjective conception. In the determinate sense in which monism is at present employed by the majority of philosophers and physical in-

quirers, the sense which I believe I was the first to establish in 1866 in my "General Morphology" (Vol. I, p. 105), it denotes a unitary or *natural* conception of the world, in opposition to a *supernatural* or mystical one, that is, in opposition to *dualism*. For us, accordingly, there exists (in the sense of Goethe) *no* opposition whatsoever between nature and mind, between World and God. Mental existences, "spirits," outside nature, or in opposition to nature, do not exist. What are commonly termed the "mental sciences,"—for example, philology, history, and philosophy,—are in reality simply a part of *physical philosophy*, of *Natur-philosophie*. The latter discipline embraces, in our opinion, the entire body of human knowledge; it is based upon *empiricism*, on the experiences, the observations, and the experiments of physical inquiry; but it does not become *philosophy* until it has brought together and united its empiric products, abstracted general laws from its isolated experiential facts, and *synthetised* the isolated results which *analysis* has empirically ascertained.

II. MECHANICALISM.

Since an early date, this important fundamental concept has frequently been used in three different and divergent senses, namely:

A. In its widest sense, as synonymous with *monism;* wherein mechanical causes (*causae efficientes*), in the sense of Kant, are assumed as the sole effective causes and are placed in opposition to the teleological causes (*causae finales*) in the sense of dualism. "Mechanical conception of the world" is in this sense synonymous with "monistic conception of the world."

B. In its more restricted sense, as a universal *motion*-principle of physics, so that, for example, the postulated ether-vibrations of optics, of electricity, and so forth, as well as the grosser material oscillations of acoustics, heat, and so forth, are designated as mechanical processes subject to definite laws. "Mechanical natural philosophy," in this sense, is identical with *physics*.

C. In its narrowest sense, as that *branch* of physics which deals with the grosser and visible processes of *motion;* as gravitation, locomotion, and the phoronomy of organisms. Mechanics, in this

the most restricted sense, is viewed as opposed to optics, acoustics, etc.; as the usages of the schools indicate.

Since, now, the phrases "mechanical laws" and "mechanical explanation," at the present day even, are frequently understood in these three distinct senses, no end of misunderstandings arise. Such misunderstandings may be best avoided, perhaps, by retaining the notion of mechanics in its narrowest (*C*) sense, and by substituting *physics* for the next narrower sense (*B*) and *monism* for its most extended sense (*A*).

III. PSYCHISM.

In exactly the same way as the idea of mechanicalism, so also that of psychism is employed in a three-fold divergent sense. As in the former case *motion*, so here *feeling* is conceived, now as a universal world-principle, now simply as a vital activity of all organisms, now simply as the particular mental activity of man.

A. In its widest sense: *Panpsychism*. All matter is ensouled, because all natural bodies known to us possess determinate chemical properties, that is to say react uniformly and by law when subjected to the determinate chemical (i. e. molecular-mechanical) influences of other bodies: *chemical affinity*. Simplest example: sulphur and quicksilver rubbed together form cinnabar, a new body of entirely different properties. This is possible only on the supposition that the molecules (or atoms) of the two elements if brought within the proper distance, mutually *feel* each other, by attraction move towards each other; on the decomposition of a simple chemical compound the contrary takes place: repulsion. (Empedocles's doctrine of the "love and hatred of atoms.")

B. In its more restricted sense: *Biopsychism*. The *organisms* alone are regarded as "ensouled," because here the chemical processes are more complicated and more striking (producing motions in cyclically repeated succession) than in the case of the so-called "dead matter" of the inorganic bodies. In particular does organic "irritability" appear here as a higher form of the physical reaction called "*Auslösung*" [the setting free, disengagement], and "soul-activity" (reflexes) again as a higher form of irritability. However, all the phenomena of organic life ultimately admit of

being reduced to "mechanical" (or "physico-chemical") processes that differ from the processes of the inorganic world only in point of degree or quatitatively, not qualitatively. ("General Morphology," I, Chap. V; VII, pp. 109–238. "Natural Creation," VIII, First Edition, Lecture XV.)

C. In its narrowest sense: *Zoopsychism.* Irritability, or universal organic soul-activity, such as is the attribute of all organisms, (identical with "life,") reaches a higher stage through abstraction, through the formation of *ideas.* *Feeling* and *will* become more distinctly separated. This real soul-life, which is the attribute only of the higher animals, passes through a long succession of different stages of development, the most perfect of which is the soul of man. The so-called "freedom of the will" is apparent only, as each single volitional action is determined by a chain of precedent actions which ultimately rest either upon *heredity* (propagation) or upon *adaptation* (nutrition). As these last are ("mechanically") reducible to molecular motions, the same also holds true of the former.

IV. THEISM.

The idea of god that alone appears to be logically compatible with monism, is pantheism (or "cosmotheism") in the sense of Goethe and Spinoza. God according to this view is identical with the sum-total of the force of the universe, which is inseparable from the sum-total of the matter of the universe. In opposition to this view stands *anthropotheism.* This is the outcome of dualism, which places God as a personal being in opposition to the "world" created by him, and consequently is always forced in its reasonings to resort to anthropomorphic expedients.

V. MATERIALISM.

The most important differences of form in which this much misunderstood and variously interpreted movement of philosophy has presented itself, may be classed as follows:

A. In its most extended sense: as synonymous with *monism* (or with mechanicalism). All the phenomena of the world are founded upon material processes, upon *motions* (mechanicalism) or upon *feelings* (psychism), both of which, as fundamental qualities, are in-

separable from matter. Immaterial forces or immaterial "spirits" (minds) are unknown to us. As Goethe once said, "Mind can never exist and act without matter, matter never without mind."

B. In its more restricted sense: originally matter alone exists and creates *secondarily* force (or "mind"). The fallacy of this view lies in its regarding the two things "matter and force" as disjoint and separate. According to our view the two are inseparably connected,—united in each atom from the very first.

VI. SPIRITUALISM.

This phase also of the world-conception has been the subject of the same misunderstandings and perverted conceptions as its apparent opposite, materialism.

A. In its most extended sense, spiritualism is susceptible of identification with *psychism*—consequently also with monism. For *feeling* (pleasure and pain) is just as much a thoroughly universal and fundamental property of matter (of each atom!) as is *motion* (attraction and repulsion). Every single "spirit" is inseparably united with some "matter."

B. In its more restricted sense: originally force alone exists and creates *secondarily* matter. This view, which is very old and very widely spread ("creation of the world"), is just as false and as one-sided as its contrary (5 *B*).

VII. IMMORTALISM.

The "belief in immortality" is scientifically (*critically*) tenable only as a *general* proposition, and is in this case identical with the most universal law of physics, the *conservation of energy* (coincidently, of course, the conservation of matter). On the other hand, the widely disseminated *dogmatic* belief in a *personal* immortality, a belief supported by the mass of the ecclesiastical religions, and of utmost importance as the consciously or unconsciously assumed *base*-axiom of a great number of philosophical systems, is, *scientifically*, absolutely untenable. The "human soul" (i. e. the sum-total of the individual life-activity: feeling, motion,—will,—and idea) is simply a transient developmentary phenomenon—a very highly developed "vertebrate-soul."

VIII. COSMISM.

The determinate, and, as I believe, logical, form of the conception of the world, the principles of which I have advocated for thirty years, and whose most important aspects have been briefly outlined in the preceding paragraphs, may also be designated *cosmism*, to the extent that it proceeds from the fundamental idea that *cosmogeny* or the "world-process," as world-*development*, is, within certain limits, (within the limits namely of a reduction to the basic notions: matter and its two inseparable fundamental qualities motion and feeling,) a *knowable* natural process. Cosmism is opposed, thus, to *agnosticism*.

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One highly important principle of my monism seems to me to be, that I regard *all* matter as *ensouled*, that is to say as endowed with *feeling* (pleasure and pain) and with *motion*, or, better, with the power of motion. As elementary (atomistic) attraction and repulsion these powers are asserted in every simplest chemical process, and on them is based also every other phenomenon, consequently also the highest-developed soul-activity of man. For the comprehension of this *graduated* psychical development of matter perhaps my three stages will be useful: III *A*. (Panpsychism), III *B*. (Biopsychism), III *C*. (Zoopsychism). So too consciousness, as the highest psychical action and the one most difficult to be explained, is in my views imply a higher stage of brain-activity, based upon the association, the abstraction, and centralisation of groups of ideas. Perhaps I have expressed myself poorly in these expositions, as I am little accustomed to dealing with philosophical axioms abstractly, and am too exclusively engaged in the concrete activity of my own special department. I cherish the hope, however, of being able within two or three years to devote more of my time to purely philosophical labors; when my work with the Challenger material, which has now absorbed twelve years of unremitting toil, is ended, my special zoological activity will have been completed; and I shall then find the opportunity of contributing more frequently to your highly valued magazines *The Monist* and *The Open Court*.

ERNST HAECKEL.

THE MAGIC SQUARE.

I.

INTRODUCTORY.

AMONG the philosophies of modern times there is no other which emphasises so much the importance of form and formal thought as the monism of *The Monist*. An expression thereof is found in the following passages:

"The order that prevails among the facts of reality is due to the laws of form. Upon the order of the world depends its cognisability.

".... The laws of form are no less eternal than are matter and energy and 'Verily I say unto you, till heaven and earth pass, one jot or one tittle shall in no wise pass from the law!'

"The laws of form and their origin have been a puzzle to all philosophers. 'Ay, there's the rub!' The difficulties of Hume's problem of causation, of Kant's *a priori*, of Plato's ideas, of Mill's method of deduction, etc., etc., all arise from a one-sided view of form and the laws of form and formal thought."

Considering the great results which engineering and other applied sciences accomplish through the assistance of mathematics, we must confess that the forms of thought are wonderful indeed, and it is not at all astonishing that the primitive thinkers of mankind when the importance of the laws of formal thought in some way or another first dawned on their minds, attributed magic powers to numbers and geometrical figures.

We shall devote the following pages to a brief review of magic squares, the consideration of which has made many a man believe in mysticism. And yet there is no mysticism about them unless we either consider everything mystical, even that twice two is four, or join the sceptic in his exclamation that we can truly not

ALBERT DÜRER'S ENGRAVING

MELANCHOLY

OR THE

GENIUS OF THE INDUSTRIAL SCIENCE OF MECHANICS.

know whether twice two might not be five in other spheres of the universe.

The author of the short article on "Magic Squares" in the English Cyclopædia (Vol. III, p. 415), presumably Prof. De Morgan, says:

"Though the question of magic squares be in itself of no use, yet it belongs to a class of problems which call into action a beneficial species of investigation. Without laying down any rules for their construction, we shall content ourselves with destroying their magic quality, and showing that the non-existence of such squares would be much more surprising than their existence."

This is the point. There obtains a symphonic harmony in mathematics which is the more startling the more obvious and self-evident it appears to him who understands the laws that produce this symphonic harmony.

* * *

On the wood-cut named "Melancholia"* of the famous Nuremberg painter, Albrecht Dürer, is found among a number of other

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* The term melancholy meant in Dürer's time, as it did also in Shakespeare's and Milton's, "thought or thoughtfulness." Says Milton in *Il Penseroso*:

> "Hail, thou Goddess, sage and holy,
> Hail divinest melancholy
> Whose saintly visage is too bright
> To hit the sense of human sight,
> And therefore to our weaker view
> O'erlaid with black, staid Wisdom's hue.—I, 12.

Thought that does not lead to action produces a gloomy state of mind. Thoughtfulness which cannot find a way out of itself is that melancholy which engenders weakness,—a truth which is illustrated in Hamlet. Shakespeare still uses the words thought and melancholy as synonyms, saying:

> "The native hue of resolution
> Is sicklied o'er with the pale cast of thought."

Dürer's melancholy does not represent the gloominess of thought, but the power of invention. Soberness and even a certain sadness are considered only as an element of this melancholy, but on the whole the genius of thought appears bright, self-possessed, and strong.

Dürer represents the Science of Mechanical Invention as a winged female figure musing over some problem. Scattered on the floor around her lie some of the simple tools used in the sixteenth century. A ladder leans against the house, that assists in climbing otherwise inaccessible heights. A scale, an hour-glass, a bell, and the magic square are hanging on the wall behind her.

At a distance a bat-like creature, being the gloom of melancholy, hovers in the air like a dark cloud, but the sun rises above the horizon, and at the happy middle between these two extremes stands the rainbow of serene hope and cheerful confidence.

emblems, which the reader will notice in our reproduction of the cut, the subjoined square. This arrangement of the sixteen natural num-

1	14	15	4
12	7	6	9
8	11	10	5
13	2	3	16

Fig. 1.

bers from 1 to 16 possesses the remarkable property that the same sum 34 will always be obtained whether we add together the four figures of any of the horizontal rows or the four of any vertical row or the four which lie in either of the two diagonals. Such an arrangement of numbers is termed a magic square, and the square which we have reproduced above is *the first magic square which is met with in the Christian Occident.*

Like chess and many of the problems founded on the figure of the chess-board, the problem of constructing a magic square also probably traces its origin to Indian soil. From there the problem found its way among the Arabs, and by them it was brought to the Roman Orient. Finally, since Albrecht Dürer's time, the scholars of Western Europe also have occupied themselves with methods for the construction of squares of this character.

The oldest and the simplest magic square consists of the quadratic arrangement of the nine numbers from 1 to 9 in such a manner that the sum of each horizontal, vertical, or diagonal row, always remains the same, namely 15. This square is the adjoined.

2	7	6
9	5	1
4	3	8

Fig. 2.

Here, we will find, 15 always comes out whether we add 2 and 7 and 6, or 9 and 5 and 1, or 4 and 3 and 8, or 2 and 9 and 4, or 7 and 5 and 3, or 6 and 1 and 8, or 2 and 5 and 8, or 6 and 5 and 4.

The question naturally presents itself, whether this condition of the constant equality of the added sum also remains fulfilled when the numbers are assigned different places. It may be easily shown

however that 5 necessarily must occupy the middle place, and that the even numbers must stand in the corners. This being so, there are but 7 additional arrangements possible, which differ from the arrangement above given and from one another only in the respect that the rows at the top, at the left, at the bottom, and at the right, exchange places with one another and that in addition a mirror be imagined present with each arrangement. So too from Dürer's square of 4 times 4 places, by transpositions, a whole set of new correct squares may be formed. A magic square of the 4 times 4 numbers from 1 to 16 is formed in the simplest manner as follows. We inscribe the numbers from 1 to 16 in their natural order in the squares, thus:

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Fig. 3.

We then leave the numbers in the four corner-squares, viz. 1, 4, 13, 16, as well also as the numbers in the four middle-squares, viz. 6, 7, 10, 11, in their original places; and in the place of the remaining eight numbers, we write the complements of the same with respect to 17: thus 15 instead of 2, 14 instead of 3, 12 instead of 5, 9 instead of 8, 8 instead of 9, 5 instead of 12, 3 instead of 14, and 2 instead of 15. We obtain thus the magic square

1	15	14	4	=34
12	6	7	9	=34
8	10	11	5	=34
13	3	2	16	=34
34	34	34	34	

Fig. 4.

from which the same sum 34 always results. It is an interesting property of this square that any four numbers which form a rectangle or square about the centre also always give the same sum 34; for example, 1, 4, 13, 16, or 6, 7, 10, 11, or 15, 14, 3, 2, or 12, 9, 5, 8,

or 15, 8, 2, 9, or 14, 12, 3, 5. We may easily convince ourselves that this square is obtainable from the square of Dürer by interchanging with one another the two middle vertical rows.

II.

EARLY METHODS FOR THE CONSTRUCTION OF ODD-NUMBERED SQUARES.

Since early times rules have also been known for the construction of magic squares of more than 3 times 3, or 4 times 4 spaces. In the first place, it is easy to calculate the sum which in the case of any given number of cells must result from the addition of each row. We take the determinate number of cells in each side of the square which we have to fill, multiply that number by itself, add 1, again multiply the number thus obtained by the number of the cells in each side, and, finally, divide the product by 2. Thus, with 4 times 4 cells or squares, we get: 4 times 4 are 16, 16 and 1 are 17, and one half of 17 times 4 is 34. Similarly, with 5 times 5 squares, we get: 5 times 5 are 25, and 1 makes 26, and the half of 26 times 5 is 65. Analogously, for 6 times 6 squares the summation 111 is obtained, for 7 times 7 squares 175, for 8 times 8 squares 260, for 9 times 9 squares 369, for 10 times 10 squares 505, and so on. The Hindu rule for the construction of magic squares whose roots are odd, may be enunciated as follows: To start with, write 1 in the centre of the topmost row, then write 2 in the lowest space of the

175= =175

30	39	48	1	10	19	28	=175
38	47	7	9	18	27	29	=175
46	6	8	17	26	35	37	=175
5	14	16	25	34	36	45	=175
13	15	24	33	42	44	4	=175
21	23	32	41	43	3	12	=175
22	31	40	49	2	11	20	=175
175	175	175	175	175	175	175	

Fig. 5.

vertical column next adjacent to the right, and then so inscribe the remaining numbers in their natural order in the squares diagonally upwards towards the right, that on reaching the right-hand margin

the inscription shall be continued from the left-hand margin in the row just above, and on reaching the upper margin shall be continued from the lower margin in the column next adjacent to the right, noting that whenever we are arrested in our progress by a square already occupied we are to fill out the square next beneath the one we have last filled. In this manner, for example, the last preceding square of 7 times 7 cells is formed, in which the reader is requested to follow the numbers in their natural sequence (Fig. 5).

For the next further advancements of the theory of magic squares and of the methods for their construction we are indebted to the Byzantian Greek, Moschopulus, who lived in the fourteenth century; also, after Albrecht Dürer who lived about the year 1500, to the celebrated arithmetician Adam Riese, and to the mathematician Michael Stifel, which two last lived about 1550. In the seventeenth century Bachet de Méziriac, and Athanasius Kircher employed themselves on magic squares. About 1700, finally, the French mathematicians De la Hire and Sauveur made considerable contributions to the theory. In recent times mathematicians have concerned themselves much less about magic squares, as they have indeed about mathematical recreations generally. But quite recently the Brunswick mathematician Scheffler has put forth his own and other's studies on this subject in an elegant form.

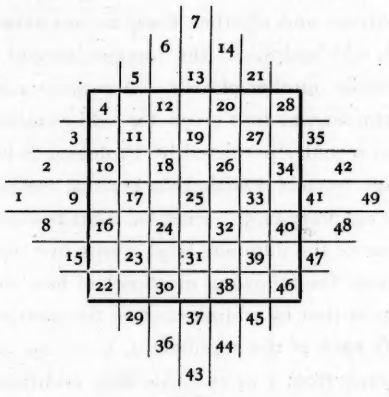

Fig. 6.

The best known of the various methods of constructing magic squares of an odd number of cells is the following. First write the numbers in diagonal succession as in the preceding diagram (Fig. 6). After 25 cells of the square of 49 cells which we have to fill out, have thus been occupied, transfer the six figures found outside each side of the square, without changing their configuration, into the empty cells of the side directly opposite. By this method, which we owe to Bachet de Méziriac, we obtain the following magic square of the numbers from 1 to 49:

4	29	12	37	20	45	28
35	11	36	19	44	27	3
10	42	18	43	26	2	34
41	17	49	25	1	33	9
16	48	24	7	32	8	40
47	23	6	31	14	39	15
22	5	30	13	38	21	46

Fig. 7.

III.

MODERN MODES OF CONSTRUCTION OF ODD-NUMBERED SQUARES.

The reader will justly ask whether there do not exist other correct magic squares which are constructed after a different method from that just given, and whether there do not exist modes of construction which will lead to all the imaginable and possible magic squares of a definite number of cells. A general mode of construction of this character was first given for odd-numbered squares by De la Hire, and recently perfected by Professor Scheffler.

To acquaint ourselves with this general method, let us select as our example a square of 5. First we form two auxiliary squares. In the first we write the numbers from 1 to 5 five times; and in the second, five times, the following multiples of five, viz.: 0, 5, 10, 15, 20. It is clear now that by adding each of the numbers of the series from 1 to 5 with each of the numbers 0, 5, 10, 15, 20, we shall get all the 25 numerals from 1 to 25. All that additionally remains to be done therefore, is, so to inscribe the numbers that by the addition

of the two numbers in any two corresponding cells each combination shall come out once and only once; and further that in each horizontal, vertical, and diagonal row in each auxiliary square each number shall once appear. Then the required sum of 65 must necessarily result in every case, because the numbers from 1 to 5 added together make 15, and the numbers 0, 5, 10, 15, 20 make 50.

We effect the required method of inscription by imagining the numbers 1, 2, 3, 4, 5 (or 0, 5, 10, 15, 20) arranged in cyclical succession, that is 1 immediately following upon 5, and, starting from any number whatsoever, by skipping each time either none or one or two or three etc. figures. Cycles are thus obtained of the first, the second, the third etc. orders; for example 3 4 5 1 2 is a cycle of the first order, 2 4 1 3 5 is a cycle of the second order, 1 5 4 3 2 is a cycle of the fourth order, etc. The only thing then to be looked out for in the two auxiliary squares is, that the same "cycle" order be horizontally preserved in all the rows, that the same also happens for the vertical rows, but that the cycle order in the horizontal and vertical rows is different. Finally we have only additionally to take care that to the same numbers of the one auxiliary square not like numbers but *different* numbers correspond in the other auxiliary square, that is lie in similarly situated cells. The following auxiliary squares are, for example, thus possible:

3	4	5	1	2
5	1	2	3	4
2	3	4	5	1
4	5	1	2	3
1	2	3	4	5

Fig. 8.

and

0	10	20	5	15
5	15	0	10	20
10	20	5	15	0
15	0	10	20	5
20	5	15	0	10

Fig. 9.

Adding in pairs the numbers which occupy similarly situated cells, we obtain the following correct magic square:

3	14	25	6	17
10	16	2	13	24
12	23	9	20	1
19	5	11	22	8
21	7	18	4	15

Fig. 10.

It will be seen that we are able thus to construct a very large number of magic squares of 5 times 5 spaces by varying in every possible manner the numbers in the two auxiliary squares. Furthermore, the squares thus formed possess the additional peculiarity, that every 5 numbers which fill out two rows that are parallel to a diagonal and lie on different sides of the diagonal also give the constant sum of 65. For example: 3 and 7, 11, 20, 24; or 10, 14 and 18, 22, 1. Altogether then the sum 65 is produced out of 20 rows or pairs of rows. On this peculiarity is dependent the fact that if we imagine an unlimited number of such squares placed by the side of, above, or beneath an initial one, we shall be able to obtain as many quadratic cells as we choose, so arranged that the square composed of any 25 of these cells will form a correct magic square, as the following figure will show:

2	13	24	10	16	2	13	24	10	16	2
9	20	1	12	23	9	20	1	12	23	9
11	22	8	19	5	11	22	8	19	5	11
18	4	15	21	7	18	4	15	21	7	18
25	6	17	3	14	25	6	17	3	14	25
2	13	24	10	16	2	13	24	10	16	2
9	20	1	12	23	9	20	1	12	23	9
11	22	8	19	5	11	22	8	19	5	11
18	4	15	21	7	18	4	15	21	7	18
25	6	17	3	14	25	6	17	3	14	25
2	13	24	10	16	2	13	24	10	16	2
9	20	1	12	23	9	20	1	12	23	9
11	22	8	19	5	11	22	8	19	5	11

Fig. 11.

Every square of every 25 of these numbers, as for example the two dark-bordered ones, possesses the property that the addition of the horizontal, vertical, and diagonal rows gives each the same sum, 65.

As an example of a higher number of cells we will append here a magic square of 11 times 11 spaces formed by the general method of De la Hire from the two auxiliary squares of Figs. 12 and 13 From these two auxiliary squares we obtain by the addition of the

two numbers of every two similarly situated cells, the magic square, exhibited in Diagram 14, in which each row gives the same sum 671.

1	2	3	4	5	6	7	8	9	10	11
3	4	5	6	7	8	9	10	11	1	2
5	6	7	8	9	10	11	1	2	3	4
7	8	9	10	11	1	2	3	4	5	6
9	10	11	1	2	3	4	5	6	7	8
11	1	2	3	4	5	6	7	8	9	10
2	3	4	5	6	7	8	9	10	11	1
4	5	6	7	8	9	10	11	1	2	3
6	7	8	9	10	11	1	2	3	4	5
8	9	10	11	1	2	3	4	5	6	7
10	11	1	2	3	4	5	6	7	8	9

Fig. 12.

0	11	22	33	44	55	66	77	88	99	110
33	44	55	66	77	88	99	110	0	11	22
66	77	88	99	110	0	11	22	33	44	55
99	110	0	11	22	33	44	55	66	77	88
11	22	33	44	55	66	77	88	99	110	0
44	55	66	77	88	99	110	0	11	22	33
77	88	99	110	0	11	22	33	44	55	66
110	0	11	22	33	44	55	66	77	88	99
22	33	44	55	66	77	88	99	110	0	11
55	66	77	88	99	110	0	11	22	33	44
88	99	110	0	11	22	33	44	55	66	77

Fig. 13.

1	13	25	37	49	61	73	85	97	109	121
36	48	60	72	84	96	108	120	11	12	24
71	83	95	107	119	10	22	23	35	47	59
106	118	9	21	33	34	46	58	70	82	94
20	32	44	45	57	69	81	93	105	117	8
55	56	68	80	92	104	116	7	19	31	43
79	91	103	115	6	18	30	42	54	66	67
114	5	17	29	41	53	65	77	78	90	102
28	40	52	64	76	88	89	101	113	4	16
63	75	87	99	100	112	3	15	27	39	51
98	110	111	2	14	26	38	50	62	74	86

Fig. 14.

IV.

EVEN-NUMBERED SQUARES.

Of magic squares having an even number of places we have hitherto had to deal only with the square of 4. To construct squares of this description having a higher even number of places, different and more complicated methods must be employed than for squares of odd numbers of places. However, in this case also, as in dealing with the square of 4, we start with the natural sequence

of the numbers and must then find the complements of the numbers with respect to some other certain number (as 17 in the square of 4) and also effect certain exchanges of the numbers with one another. To form, for example, a magic square of 6 times 6 places, we inscribe in the 12 diagonal cells the numbers that in the natural sequence of inscription fall into these places, then in the remaining cells the complements of the numbers that belong therein with respect to 37, and finally effect the following six exchanges, viz. of the numbers 33 and 3, 25 and 7, 20 and 14, 18 and 13, 10 and 9, and 5 and 2. In this way the following magic square is obtained.

1	35	34	3	32	6
30	8	28	27	11	7
24	23	15	16	14	19
13	17	21	22	20	18
12	26	9	10	29	25
31	2	4	33	5	36

Fig. 15.

This square may also be constructed by the method of De la Hire, from two auxiliary squares with the numbers 1, 2, 3, 4, 5, 6 and 0, 6, 12, 18, 24, 30 respectively. In this case, however, the vertical rows of the one square and the horizontal rows of the other must each so contain two same numbers thrice repeated that the summation shall always remain 21 and 90 respectively. In this manner we get the magic square last given above from the two following auxiliary squares:

1	5	4	3	2	6
6	2	4	3	5	1
6	5	3	4	2	1
1	5	3	4	2	6
6	2	3	4	5	1
1	2	4	3	5	6

Fig. 16.

and

0	30	30	0	30	0
24	6	24	24	6	6
18	18	12	12	12	18
12	12	18	18	18	12
6	24	6	6	24	24
30	0	0	30	0	30

Fig. 17.

It is to be noted in connection with this example that here also as in the case of odd-numbered squares, it is possible so to inscribe

six times the numbers from 1 to 6 that each number shall appear once and only once in each horizontal, vertical, and diagonal row; for example, in the following manner:

1	2	3	4	5	6
2	4	6	1	3	5
3	6	5	2	1	4
5	3	1	6	4	2
6	5	4	3	2	1
4	1	2	5	6	3

Fig. 18.

But if we attempt so to insert, in a like manner, the other set of numbers 0, 6, 12, 18, 24, 30 in a second auxiliary square, that each number of the first auxiliary square shall stand once and once only in a corresponding cell with each number of the second square, all the attempts we may make to fulfil coincidently the last named condition will result in failure. It is therefore necessary to select auxiliary squares like the two given above. It is noteworthy, that the fulfilment of the second condition is impossible only in the case of the square of 6, but that in the case of the square of 4 or of the square of 8, for example, two auxiliary squares, such as the method of De la Hire requires, are possible. Thus, taking the square of 4 we get

1	2	3	4
4	3	2	1
2	1	4	3
3	4	1	2

Fig. 19.

and

C S H D

0	4	8	12
8	12	0	4
12	8	4	0
4	0	12	8

Fig. 20.

The reader may form for himself the magic square which these give.

The existence of these two auxiliary squares furnishes a key to the solution of a pretty problem at cards. If we replace, namely, the numbers 1, 2, 3, 4 by the Ace, the King, the Queen, and the Knave, and the numbers 0, 4, 8, 12 by the four suits, clubs, spades, hearts, and diamonds, we shall at once perceive that it is possible, and must be so necessarily, quadratically to arrange in such a manner the four Aces, the four Kings, the Four Queens, and the four

Knaves, that in each horizontal, vertical, and diagonal row, each one of the four suits and each one of the four denominations shall appear once and once only. The auxiliary squares above given furnish the appended solution of this problem:

CLUBS ACE	SPADES KING	HEARTS QUEEN	DIAMONDS KNAVE
HEARTS KNAVE	DIAMONDS QUEEN	CLUBS KING	SPADES ACE
DIAMONDS KING	HEARTS ACE	SPADES KNAVE	CLUBS QUEEN
SPADES QUEEN	CLUBS KNAVE	DIAMONDS ACE	HEARTS KING

Fig. 21.

To fix the solution of the problem in the memory, observe that, starting from the several corners, each suit and each denomination must be placed in the spots of the move of a Knight. If we fix the positions of the four cards of any one row, there will be only two possibilities left of so placing the other cards that the required condition of having each suit and each denomination once and only once in each row shall be fulfilled.

Of magic squares of an even number of places we have up to this point examined only the squares of 4 and of 6. For the sake of completeness we append here one of 8 and one of 10 places. The mode of construction of these squares is similar to the method above discussed for the lower even numbers.

1	63	62	4	5	59	58	8
56	10	11	53	52	14	15	49
48	18	19	45	44	22	23	41
25	39	38	28	29	35	34	32
33	31	30	36	37	27	26	40
24	42	43	21	20	46	47	17
16	50	51	13	12	54	55	9
57	7	6	60	61	3	2	64

Fig. 22.

1	99	3	97	96	5	94	8	92	10
90	12	88	14	86	85	17	83	19	11
80	79	23	77	25	26	74	28	22	71
31	69	68	34	66	65	37	33	62	40
60	42	58	57	45	46	44	53	49	51
50	52	43	47	55	56	54	48	59	41
61	32	38	64	36	35	67	63	39	70
21	29	73	27	75	76	24	78	72	30
20	82	18	84	15	16	87	13	89	81
91	9	93	4	6	95	7	98	2	100

Fig. 23.

The magic squares of even numbers thus constructed are not the only possible ones. On the contrary, there are very many others possible, which obey different laws of formation. It has been calculated, for example, that with the square of 4 it is possible to construct 880, and with the square of 6, *several million*, different magic squares. The number of odd-numbered magic squares constructible by the method of De la Hire is also very great. With the square of 7, the possible constructions amount to 363,916,800. With the squares of higher numbers the multitude of the possibilities increases in the same enormous ratio.

V.

MAGIC SQUARES WHOSE SUMMATION GIVES THE NUMBER OF A YEAR.

The magic squares which we have so far considered contain only the natural numbers from 1 upwards. It is possible, however, easily to deduce from a correct magic square other squares in which a different law controls the sequence of the numbers to be inscribed. Of the squares obtained in this manner, we shall devote our attention here only to such in which, although formed by the inscription of successive numbers, the sum obtained from the addition of the rows is a determinate number which we have fixed upon beforehand, as *the number of a year*. In such a case we have simply to add to the numbers of the original square a determinate number so to be calculated, that the required sum shall each time appear. If this

sum is divisible by 3, magic squares will always be obtainable with 3 times 3 spaces which shall give this sum. In such a case we divide the sum required by 3 and subtract 5 from the result in order to obtain the number which we have to add to each number of the original square. If the sum desired is even but not divisible by 4, we must then subtract from it 34 and take one fourth of the result, to obtain the number which in this case is to be added in each place. If, for example, we wish to obtain the number of the year 1890 as the resulting sum of each row, we shall have to add to each of the numbers of an ordinary magic square of 4 times 4 spaces the number 464; in other words, instead of the numbers from 1 to 16 we have to insert in the squares the numbers from 465 to 480. As the number of the present year 1892 is divisible by 11, it must be possible to deduce from the magic square constructed by us at the conclusion of Section III a second magic square in which each row of 11 cells will give the number of the year 1892. To do this, we subtract from 1892 the sum of the original square, namely 671, and divide the remainder by 11, whereby we get 111 and thus perceive that the numbers from 112 to 232 are to be inscribed in the cells of

112	124	136	148	160	172	184	196	208	220	232	=1892
147	159	171	183	195	207	219	231	122	123	135	=1892
182	194	206	218	230	121	133	134	146	158	170	=1892
217	229	120	132	144	145	157	169	181	193	205	=1892
131	143	155	156	168	180	192	204	216	228	119	=1892
166	167	179	191	203	215	227	118	130	142	154	=1892
190	202	214	226	117	129	141	153	165	177	178	=1892
225	116	128	140	152	164	176	188	189	201	213	=1892
139	151	163	175	187	199	200	212	224	115	127	=1892
174	186	198	210	211	223	114	126	138	150	162	=1892
209	221	222	113	125	137	149	161	173	185	197	=1892
1892	1892	1892	1892	1892	1892	1892	1892	1892	1892	1892	

Fig. 24.

the square required. We get in this way the preceding square, from which *one and the same sum, namely 1892, can be obtained 44 times*, first from each of the 11 horizontal rows, secondly from each of the 11 vertical rows, thirdly from each of the two diagonal rows, and

fourthly twenty additional times from each and every pair of any two rows that lie parallel to a diagonal, have together 11 cells, and lie on different sides of the diagonal, as for example, 196, 122, 158, 205, 131, 167, 214, 140, 187, 223, 149.

VI.

CONCENTRIC MAGIC SQUARES.

The acuteness of the mathematicians has also discovered magic squares which possess the peculiar property that if one row after another be taken away from each side, the smaller inner squares remaining will still be magical squares, that is to say, all their rows when added will give the same sum. It will be sufficient to give two examples here of such squares, (the laws for their construction being somewhat more complicated,) of which the first has 7 times 7 and the second 8 times 8 places. The numbers within each of the dark-bordered frames form with respect to the centre smaller squares which in their own turn are magical.

4	5	6	43	39	38	40
49	15	16	33	30	31	1
48	37	22	27	26	13	2
47	36	29	25	21	14	3
8	18	24	23	28	32	42
9	19	34	17	20	35	41
10	45	44	7	11	12	46

Fig. 25.

1	56	55	11	53	13	14	57
63	15	47	22	42	24	45	2
62	49	25	40	34	31	16	3
4	48	28	37	35	30	17	61
5	44	39	26	32	33	21	60
59	19	38	27	29	36	46	6
58	20	18	43	23	41	50	7
8	9	10	54	12	52	51	64

Fig. 26.

In the first of these two squares the internal square of 3 times 3 places contains the numbers from 21 to 29 in such a manner that each row gives when added the sum of 75. This square lies within a larger one of 5 times 5 spaces, which contains the numbers from 13 to 37 in such a manner that each row gives the sum of 125. Finally, this last square forms part of a square of 7 times 7 places which contains the numbers from 1 to 49 so that each row gives the sum of 175.

In the second square the inner central square of 4 times 4 places contains the numbers from 25 to 40 in such a manner that each row

gives the sum of 130. This square is the middle of a square of 6 times 6 places which so contains the numbers from 15 to 50 that each row gives the sum 165. Finally, this last square is again the middle of an ordinary magic square composed of the numbers from 1 to 64.

VII.

MAGICAL SQUARES WITH MAGICAL PARTS.

If we divide a square of 8 times 8 places by means of the two middle lines parallel to its sides into 4 parts containing each 4 times 4 spaces, we may propound the problem of so inserting the numbers from 1 to 64 in these spaces that not only the whole shall form a magic square, but also that each of the 4 parts individually shall be magical, that is to say, give the same sum for each row. This problem also has been successfully solved, as the following diagram will show.

1	4	63	62	5	8	59	58
64	61	2	3	60	57	6	7
42	43	24	21	34	35	32	29
23	22	41	44	31	30	33	36
13	16	51	50	9	12	55	54
52	49	14	15	56	53	10	11
38	39	28	25	46	47	20	17
27	26	37	40	19	18	45	48

Fig. 27.

The 4 numbers in each row of any one of the sub-squares here, gives 130; so that the sum of each one of the rows of the large square will be 260.

Finally, in further illustration of this idea, we will submit to the consideration of our readers a very remarkable square of the numbers from 1 to 81. This square, which will be found on the following page (Fig. 28), is divided by parallel lines into 9 parts, of which each contains 9 consecutive numbers that severally make up a magic square by themselves.

Wonderful as the properties of this square may appear, the law by which the author constructed it is equally simple. We have

simply to regard the 9 parts as the 9 cells of a magic square of the numbers from I to IX, and then to inscribe by the magic prescript in the square designated as I the numbers from 1 to 9, in the square

31	36	29	76	81	74	13	18	11
30	32	34	75	77	79	12	14	16
35	28	33	80	73	78	17	10	15
22	27	20	40	45	38	58	63	56
21	23	25	39	41	43	57	59	61
26	19	24	44	37	42	62	55	60
67	72	65	4	9	2	49	54	47
66	68	70	3	5	7	48	50	52
71	64	69	8	1	6	53	46	51

Fig. 28.

designated as II the numbers from 10 to 18, and so on. In this way the square above given is obtained from the following base-square:

IV	IX	II
III	V	VII
VIII	I	VI

Fig. 29.

VIII.

MAGIC SQUARES THAT INVOLVE THE MOVE OF THE CHESS-KNIGHT.

What one of our readers does not know the problems contained in the recreation columns of our magazines, the requirements of which are to compose into a verse 8 times 8 quadratically arranged syllables, of which every two successive syllables stand on spots so situated with respect to each other that a chess-knight can move from the one to the other? If we replace in such an arrangement the 64 successive syllables by the 64 numbers from 1 to 64, we shall obtain a knight-problem made up of numbers. Methods also exist indeed for the construction of such dispositions of numbers, which then form the foundation of the construction of the problems in the newspapers. But the majority of knight-problems of this class are the outcome of experiment rather than the product of method-

ical creation. If however it is a severe test of patience to form a knight-problem by experiment, it stands to reason that it is a still severer trial to effect at the same time the additional result that the 64 numbers which form the knight-problem shall also form a magic square.

This trial of endurance was undertaken several decades ago, by a pensioned Moravian officer named Wenzelides, who was spending the last days of his life in the country. After a series of trials which lasted years he finally succeeded in so inscribing in the 64 squares of the chess-board the numbers from 1 to 64 that successive numbers, as well also as the numbers 64 and 1, were always removed from one another in distance and direction by the move of a knight, and that in addition thereto the summation of the horizontal and the vertical rows always gave the same sum 260. Ultimately he discovered several squares of this description, which were published in the *Berlin Chess Journal.* One of these is here appended :

47	10	23	64	49	2	59	6
22	63	48	9	60	5	50	3
11	46	61	24	1	52	7	58
62	21	12	45	8	57	4	51
19	36	25	40	13	44	53	30
26	39	20	33	56	29	14	43
35	18	37	28	41	16	31	54
38	27	34	17	32	55	42	15

Fig. 30.

The move of the knight and the equality of the summation of the horizontal and vertical rows, therefore, are the facts to be noted here. The diagonal rows do *not* give the sum 260. Perhaps some one among our readers who possesses the time and patience will be tempted to outdo Wenzelides, and to devise a numeral knight-problem of this kind which will give 260 not only in the horizontal and vertical but also in the two diagonal rows.

IX.

MAGICAL POLYGONS.

So far we have only considered such extensions of the idea underlying the construction of the magic square in which the figure of the square was retained. We may however contrive extensions of the idea in which instead of a square, a rectangle, a triangle, or a pentagon, and the like, appear. Without entering into the consideration of the methods for the construction of such figures, we will give here of magical polygons simply a few examples, all supplied by Professor Scheffler:

1) The numbers from 1 to 32 admit of being written in a rectangle of 4 × 8 in such a manner that the long horizontal rows give the sum of 132 and the short vertical rows the sum of 66; thus:

1	10	11	29	28	19	18	16
9	2	30	12	20	27	7	25
24	31	3	21	13	6	26	8
32	23	22	4	5	14	15	17

Fig. 31.

2) The numbers from 1 to 27 admit of being so arranged in three regular triangles about a point which forms a common centre, that each side of the outermost triangle will present 6 numbers of the total summation 96 and each side of the middle triangle 4 numbers whose sum is 61; as the following figure shows:

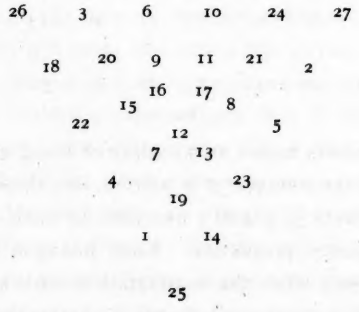

Fig. 32.

3) The numbers from 1 to 80 admit of being formed about a point as common centre into 4 pentagons, such that each side of the first pentagon from within contains two numbers, each side of the second pentagon four numbers, each of the third six numbers, and each side of the fourth, outermost pentagon eight numbers. The sum of the numbers of each side of the second pentagon is 122, the sum of those of each side of the third pentagon is 248, and that of those of each side of the fourth pentagon 254. Furthermore, the sum of any four corner numbers lying in the same straight line with the centre, is also the same; namely, 92.

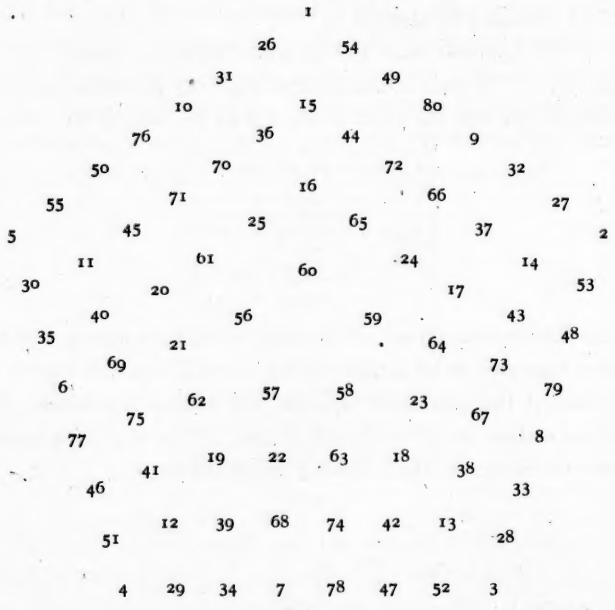

Fig. 33.

4) The numbers from 1 to 73 admit of being arranged about a centre, in which the number 37 is written, into three hexagons which contain respectively 3, 5, and 7 numbers in each side and possess the following pretty properties. Each hexagon always gives the same sum, not only when the summation is made along its six sides, but also when it is made along the six diameters that join its corners

and along the six that are constructed at right angles to its sides; this sum, for the first hexagon from within, is 111, for the second 185, and for the third 259.

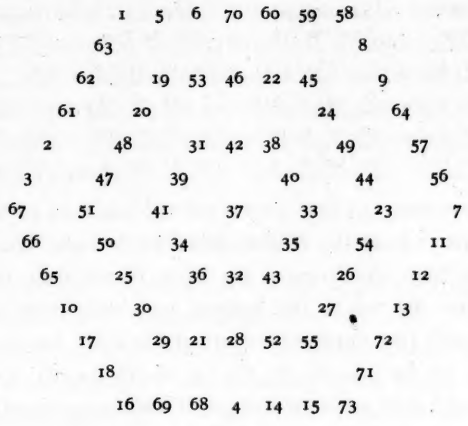

Fig. 34.

X.

MAGIC CUBES.

Several inquirers, particularly Kochansky (1686), Sauveur (1710), Hugel (1859), and Scheffler (1882), have extended the principle of the magic squares of the plane to three-dimensioned space. Imagine a cube divided by planes parallel to its sides and equidistant from one another, into cubical compartments. The problem is then, so to insert in these compartments the successive natural numbers that every row from the right to the left, every row from the front to the back, every row from the top to the bottom, every diagonal of a square, and every principal diagonal passing through the centre of the cube shall contain numbers whose sum is always the same. For 3 times 3 times 3 compartments, a magic cube of this description is not constructible. For 4 times, 4 times 4 compartments a cube is constructible such that any row parallel to an edge of the cube and every principal diagonal give the sum of 130. To obtain a magic cube of 64 compartments, imagine the numbers which belong in the compartments written on the upper surface of the same

and the numbers then taken off in layers of 16 from the top downwards. We obtain thus 4 squares of 16 cells each, which together make up the magic cube; as the following diagrams will show:

First Layer from the Top.

1	48	32	49
60	21	37	12
56	25	41	8
13	36	20	61

Second Layer from the Top.

63	18	34	15
6	43	27	54
10	39	23	58
51	30	46	3

Third Layer from the Top.

62	19	35	14
7	42	26	55
11	38	22	59
50	31	47	2

Fourth Layer from the Top.

4	45	29	52
57	24	40	9
53	28	44	5
16	33	17	64

The same sum 130 here comes out not less than 52 times; viz. in the first place from the 16 rows from left to right, secondly from the 16 rows from the front to the back, thirdly from the 16 rows counting from the top to the bottom, and lastly from the 4 rows which join each two opposite corners of the cube, namely from the rows: 1, 43, 22, 64; 49, 27, 38, 16; 13, 39, 26, 52; 61, 23, 42, 4.

For a cube with 5 compartments in each edge the arrangement of the figures can so be made that all the 75 rows parallel to any and every edge, all the 30 rows lying in any diagonal of a square, and all the 4 rows forming any principal diagonal shall have one and the same summation, 315.

Just as the magic squares of an odd number of cells could be formed with the aid of *two* auxiliary squares, so also odd-numbered magic cubes can be constructed with the help of *three* auxiliary cubes.

First Layer from Top.

121	27	83	14	70
10	61	117	48	79
44	100	1	57	113
53	109	40	91	22
87	18	74	105	31

Second Layer from Top.

2	58	114	45	96
36	92	23	54	110
75	101	32	88	19
84	15	66	122	28
118	49	80	6	62

Third Layer from Top.

33	89	20	71	102
67	123	29	85	11
76	7	63	119	50
115	41	97	3	59
24	55	106	37	93

Fourth Layer from Top.

64	120	46	77	8
98	4	60	111	42
107	38	94	25	51
16	72	103	34	90
30	81	12	68	124

Lowest Layer.

95	21	52	108	39
104	35	86	17	73
13	69	125	26	82
47	78	9	65	116
56	112	43	99	5

In this manner the preceding magic cube of 5 times 5 times 5 compartments is formed, in which, it may be additionally noticed, the middle number between 1 and 125, namely 63, is placed in the central compartment; by which arrangement the attainment of the sum of 315 is assured in the four principal diagonals and the 30 sub-diagonals. The condition attained in the magic squares, that the diagonal-pairs parallel to the sub-diagonals also shall give the sum 315 is not attainable in this case but is so in the case of higher numbers of compartments.

CONCLUSION.

Musing on such problems as are the magic squares is fascinating to thinkers of a mathematical turn of mind. We take delight in discovering a harmony that abides as an intrinsic quality in the forms of our thought. The problems of the magic squares are playful puzzles, invented as it seems for mere pastime and sport. But there is a deeper problem underlying all these little riddles, and this deeper problem is of a sweeping significance. It is the philosophical problem of the world-order.

The formal sciences are creations of the mind. We build the sciences of mathematics, geometry, and algebra with our conception of pure forms which are abstract ideas. And the same order that prevails in these mental constructions permeates the universe, so that an old philosopher, overwhelmed with the grandeur of law, imagined he heard its rhythm in a cosmic harmony of the spheres.

H. SCHUBERT.

MR. SPENCER ON THE ETHICS OF KANT.

MR. HERBERT SPENCER published in the *Fortnightly Review* for July 1888 and in the *Popular Science Monthly* for August of the same year an article on "The Ethics of Kant" in which he so strangely misrepresents Kant's position that Kant to any uninitiated reader must appear not only as superficial and shallow, but even as palpably nonsensical.

Mr. Spencer's article on "The Ethics of Kant" is a severe criticism mainly of the nonsensical idea, erroneously imputed to Kant, of a will that has no end. At the same time Mr. Spencer reproaches Kant with assuming the simplicity of conscience and believing in a non-evolutionary origin of the minds of living beings.

In reply to Mr. Spencer an editorial article appeared in *The Open Court* under the caption "Herbert Spencer on the Ethics of Kant" (Nos. 51 and 52), which was supplemented by another article entitled "Kant on Evolution" (No. 158), the latter being elicited by a renewed attack of Mr. Spencer upon Kant's views (which appeared in *Mind*, No. LIX, p. 313).

Mr. Spencer has republished his article "The Ethics of Kant" together with many other older articles in a work of three volumes entitled "Essays Scientific, Political, and Speculative," 1891, in which he repeats the following sentence:

> "Thus the basis of the argument by which Kant attempts to justify his assumption that there exists a good will apart from a good end, disappears utterly; and leaves his dogma in all its naked unthinkableness."

To this sentence he adds the following foot-note as a reply to my criticisms:

"I find that in the above three paragraphs I have done Kant less than justice and more than justice—less, in assuming that his evolutionary view was limited to the genesis of our sidereal system, and more, in assuming that he had not contradicted himself. My knowledge of Kant's writings is extremely limited. In 1844 a translation of his 'Critique of Pure Reason' (then I think lately published) fell into my hands, and I read the first few pages enunciating his doctrine of Time and Space: my peremptory rejection of which caused me to lay the book down. Twice since then the same thing has happened; for, being an impatient reader, when I disagree with the cardinal propositions of a work I can go no further. One other thing I knew. By indirect references I was made aware that Kant had propounded the idea that celestial bodies have been formed by the aggregation of diffused matter. Beyond this my knowledge of his conceptions did not extend; and my supposition that his evolutionary conception had stopped short with the genesis of sun, stars, and planets, was due to the fact that his doctrine of Time and Space, as forms of thought anteceding experience, implied a supernatural origin inconsistent with the hypothesis of natural genesis. Dr. Paul Carus, who, shortly after the publication of this article in the *Fortnightly Review* for July, 1888, undertook to defend the Kantian ethics in the American journal which he edits, *The Open Court*, has now (Sept. 4, 1890), in another defensive article, translated sundry passages from Kant's 'Critique of Judgment,' his 'Presumable Origin of Humanity,' and his work 'Upon the different Races of Mankind,' showing that Kant was, if not fully, yet partially, an evolutionist in his speculations about living beings. There is, perhaps, some reason for doubting the correctness of Dr. Carus's rendering of these passages into English. When, as in the first of the articles just named, he failed to distinguish between consciousness and conscientiousness, and when, as in this last article, he blames the English for mistranslating Kant, since they have said 'Kant maintained that Space and Time are intuitions,' which is quite untrue, for they have everywhere described him as maintaining that Space and Time are *forms* of intuition, one may be excused for thinking that possibly Dr. Carus has read into some of Kant's expressions, meanings which they do not rightly bear. Still, the general drift of the passages quoted makes it tolerably clear that Kant must have believed in the operation of natural causes as largely, though not entirely, instrumental in producing organic forms: extending this belief (which he says 'can be named a daring venture of reason') in some measure to the origin of Man himself. He does not, however extend the theory of natural genesis to the exclusion of the theory of supernatural genesis. When he speaks of an organic habit 'which in the wisdom of nature appears to be thus arranged in order that the species shall be preserved'; and when, further, he says 'we see, moreover, that a germ of reason is placed in him, whereby, after the development of the same, he is destined for social intercourse,' he implies divine intervention. And this shows that I was justified in ascribing to him the belief that Space and Time, as forms of thought, are supernatural endowments. Had he conceived of organic evolution in a consistent manner,

he would necessarily have regarded Space and Time as subjective forms generated by converse with objective realities.

"Beyond showing that Kant had a partial, if not a complete, belief in organic evolution (though with no idea of its causes), the passages translated by Dr. Carus show that he entertained an implied belief which it here specially concerns me to notice as bearing on his theory of 'a good will.' He quotes approvingly Dr. Moscati's lecture showing 'that the upright walk of man is constrained and unnatural,' and showing the imperfect visceral arrangements and consequent diseases which result: not only adopting, but further illustrating, Dr. Moscati's argument. If here, then, there is a distinct admission, or rather assertion, that various human organs are imperfectly adjusted to their functions, what becomes of the postulate above quoted 'that no organ for any purpose will be found in it but what is also the fittest and best adapted for that purpose'? And what becomes of the argument which sets out with this postulate? Clearly, I am indebted to Dr. Carus for enabling me to prove that Kant's defence of his theory of 'a good will' is, by his own showing, baseless."

Mr. Spencer's reply to my criticisms is surprising in more than one respect.

First, without even mentioning the objections I make he discredits my arguments by throwing doubt upon the correctness of the translations of the quoted passages.

Secondly, he alleges, with a view of justifying his doubt, that in the first of my articles I "failed to distinguish between consciousness and conscientiousness."*

Thirdly, Mr. Spencer declares that I had "read into some of Kant's expressions, meanings which they do not rightly bear."

Fourthly, Mr. Spencer bases this opinion upon a double mistake: he blames me for not distinguishing between the Kantian phrases that "Space and Time are intuitions" and that they are "forms of intuition."

Fifthly, acknowledging after all that Kant had at least "a partial belief in organic evolution," Mr. Spencer accuses him of inconsistency.

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*This article "Herbert Spencer on the Ethics of Kant" was electrotyped at the time it appeared in *The Open Court*. It is appended to this number of *The Monist* as documentary evidence of the fact, that there is not even so much as an occasion in the article for confounding "consciousness" and "conscientiousness."

Sixthly, several statements concerning Kant's views are made not because Kant held them but because Mr. Spencer assumes for trivial reasons that he is "justified in ascribing them to him."

Seventhly, these statements so vigorously set forth are accompanied by Mr. Spencer's remarkably frank confession of unfamiliarity with the subject under discussion.

It may be added that Mr. Spencer calls my criticisms "defensive articles." He says that "I undertook to defend the Kantian ethics"; while, in fact, my articles are aggressive. Kant needs no defense for being misunderstood, and it would not be my business to defend him, for I am not a Kantian in the sense that I adopt any of the main doctrines of Kant. On the contrary I dissent from him on almost all fundamental questions. In ethics I object to Kant's views in so far as they can be considered as pure formalism.* I am a Kantian only in the sense that I respect Kant as one of the most eminent philosophers, that I revere him as that teacher of mine whose influence upon me was greatest, and I consider the study of Kant's works as an indispensable requisite for understanding the problems of the philosophy of our time. Far from defending Kant's position, I only undertook to inform Mr. Spencer of what Kant had really maintained, so that instead of denouncing absurdities which Kant had never thought of, he might criticise the real Kant.

* * *

I shall now take up the details of Mr. Spencer's reply:

I.

I am sorry to see that Mr. Spencer, instead of frankly acknowledging his errors, has taken refuge in discrediting the translations, which might very easily have been examined either by himself or by friends of his; especially as the German original of the most important passages, wherever any doubt might arise, and also of those expressions on the misconception of which Mr. Spencer bases his unfavorable opinion of Kant, were added in foot-notes.

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*See *Fundamental Problems*, pp. 197–206; and *The Ethical Problem*, p. 32, seq., especially p. 33, lines 18–20.

II.

But Mr. Spencer adduces, as if it were a fact, an instance of my grave mistakes. He says that I failed to distinguish between "consciousness" and "conscientiousness." Mr. Spencer makes much of a small matter, which, if it were as he assumes, would have to be considered as a misprint.

Mr. Spencer's statement is so positive that it must make on any reader the impression of being indubitably true. However, in the whole first article of mine, and indeed in both articles, "conscientiousness" is nowhere mentioned and it would be wrong to replace the word "consciousness" in any of the passages in which it occurs by "conscientiousness."

I should be glad if Mr. Spencer would kindly point out to me the passage which he had in mind when making his statement, for since there is not even so much as an occasion for confounding consciousness and conscientiousness, I stand here before a psychological problem. Mr. Spencer's statement is a perfect riddle to me. Either I have a negative hallucination, as psychologists call it, so that I do not see what is really there, or Mr. Spencer must have had a positive hallucination. That which Mr. Spencer has read into my article, was never written and it is not there. The alleged fact to which he refers, does not exist.

This kind of erroneous reference into which Mr. Spencer has inadvertently fallen is a very grievous mistake. It appears more serious than a simple slip of the pen, when we consider that Mr. Spencer uses the statement for the purpose of incrimination. He justifies upon this exceedingly slender basis his doubt concerning the correctness of the translations of the quoted passages, and Mr. Spencer's doubt concerning the correctness of these translations is his main argument for rejecting my criticisms *in toto*.

It is not impossible, indeed it is probable, that Mr. Spencer meant "conscience" instead of "conscientiousness." There is one passage in which a superficial reader might have expected "conscience" in place of consciousness." However that does not occur in any of the translations, but in a paragraph where I speak on my

own account. This passage appears in the appended reprint on page 23, line 14. Whatever anybody might have expected in that passage, I certainly intended to say "consciousness," and only a hasty reader, only he who might merely read the first line of the paragraph, would consider the word "consciousness" a mistake.

To avoid any equivocation, however, even to hasty readers, and to guard against a misconstruction such as Mr. Spencer possibly has given to the sentence, I propose to alter the passage by adding a few words as follows:

"It is quite true that *not only conscience, but* every state of consciousness is a feeling," etc.

The italicised words are inserted, simply to show that here I mean "consciousness," and *not* "conscience." For the rest, they do not alter in the least the sense of the sentence. In this passage as throughout the whole article the terms "consciousness," and "conscience" have been used properly.

* * *

Observing that Mr. Spencer appears to have committed the same mistake for which he erroneously blames me, I do not mean to say that he "failed to distinguish between" conscientiousness and conscience. I should rather regard it as trifling on my part if I drew this inference from what is either a slip of the pen or an oversight in proof-reading. But it strikes me that that knavish rogue among the fairies whom Shakespeare calls Puck and scientists define as chance or coincidence played in a fit of anger and perhaps from a sentiment of pardonable irony a humorous trick upon Mr. Spencer. The moral of it is that when an author censures his fellow authors with undue severity for things that might be mere misprints, he should keep a close eye on his own printer's devil.

III.

Mr. Spencer discredits my knowledge of Kant. He says of me:

"One may be excused for thinking that possibly Dr. Carus has read into some of Kant's expressions, meanings which they do not rightly bear."

I did not give Mr. Spencer any occasion for making this personal reflection. I do not boast of any extraordinary familiarity

with Kant's writings. There are innumerable German and also English and American scholars and philosophers who know Kant almost by heart. But the question at issue is not what I conceive Kant's ideas to be, but what Kant has really said, and I was very careful in letting Kant speak for himself.

My criticism of Mr. Spencer's conception of Kant consisted almost exclusively in collating and contrasting Mr. Spencer's views of Kant with quotations from Kant's works. How can I read anything into some of Kant's expressions, if I present translations of the expressions themselves, adding thereto in foot-notes the original whenever doubts could arise? And the general drift of the quotations alone suffices to overthrow Mr. Spencer's conception of Kant.

The truth is that Mr. Spencer committed the mistake himself, for which he censures me unjustly. "Mr. Spencer has read into some of Kant's expressions meanings which they do not rightly bear."

IV.

But Mr. Spencer adduces a fact, which, if it were as Mr. Spencer represents it, would show an inability on my part of making important distinctions. He says of me:

"He blames the English for mistranslating Kant, since they have said 'Kant maintained that Space and Time are intuitions,' which is quite untrue, for they have everywhere described him as maintaining that Space and Time are *forms* of intuition."

This is a double mistake: (1) Kant and his translators did not make the distinction of which Mr. Spencer speaks, and (2) the quotation Mr. Spencer makes from my article is represented to mean something different from what it actually means in the context.

Before I speak for myself as to what I actually said, let us state the facts concerning Kant's usage of the terms "intuitions" and "forms of intuition."

Kant defines in § 1 of his "Critique of Pure Reason" what he understands by "Transcendental Æsthetic." He distinguishes between "empirical intuition" (*empirische Anschauung*) and "pure intuition" (*reine Anschauung*). He says:

"That sort of intuition which relates to an object by means of sensation, is called an empirical intuition."

Representations contain besides that which belongs to sensation some other elements. Kant says:

"That which effects that the content of the phenomenon can be arranged under certain relations, I call its *form*."

And later on he continues:

"This pure form of sensibility I shall call pure intuition."

These are Kant's phrases in J. M. D. Meiklejohn's well known translation. The term "pure intuition" is repeated again and again, and we find frequently added by way of explanation the phrases "as a mere form of sensibility," "the mere form of phenomena," "forms of sensuous intuition," and also (as Mr. Spencer emphasises as the only correct way) "forms of intuition."

Kant says:

1) "*Diese reine Form der Sinnlichkeit wird auch selber reine Anschauung heissen.* § 1.

2) "*Zweitens werden wir von dieser (der empirischen Anschauung) noch alles abtrennen, damit nichts als reine Anschauung und die blosse Form der Erscheinungen übrig bleibe.* § 1.

3) "*Raum . . . . muss ursprünglich Anschauung sein.* § 3.

4) "*Der Raum ist nichts anderes als nur die Form aller Erscheinungen äusserer Sinne.* § 3.

5) "*Der Raum aber betrifft nur die reine Form der Anschauung.* (This passage appears in the first edition only, the paragraph containing it is omitted in the second edition.) § 3.

6) "*Die Zeit ist . . . . eine reine Form der sinnlichen Anschauung.* . . . § 4.

7) "*Es muss ihr* unmittelbare Anschauung zum Grunde liegen.* § 4.

8) "*Die Zeit ist nichts anderes als die Form des inneren Sinnes.* § 6.

9) ". . . . *dass die Vorstellung der Zeit selbst Anschauung sei.* § 6.

10) "*Wir haben nun . . . . reine Anschauung a priori, Raum und Zeit.* § 10. *Beschluss der transcendentalen Æsthetik.*"

These quotations do not pretend to be exhaustive, nor is that necessary for the present purpose.

Kant, as we learn from these quotations, makes no distinction between ***reine Anschauung*** and ***Form der Anschauung.*** He uses most frequently the term *reine Anschauung* and designates in several places

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* Second edition reads "*ihnen*" in place of "*ihr*," viz. *der Zeit*.. The word "*ihnen*" refers to *Theilvorstellungen der Zeit.*

Space and Time simply as *Anschauung*. (See the quotations 3, 7, and 9.) So far as I can gather from a renewed perusal, the expression proposed by Mr. Spencer, "form of intuition," *Form der Anschauung*, occurs only once and that too in a passage omitted in the second edition.

It is almost redundant to add that the English translators and interpreters of Kant follow the original pretty closely. Accordingly it is actually incorrect "that they have everywhere (!) described Kant as maintaining that Space and Time are *forms* of intuition." In addition to the quotations from Meiklejohn, I call Mr. Spencer's attention to William Flemming's "Vocabulary of Philosophy" (4th ed., edited by Henry Calderwood) which reads *sub voce* "Intuition," p. 228 with reference to Kant's view:

"Space and time are *intuitions* of sense."

To say "Time and Space are forms of intuition" is quite correct according to Kantian terminology. No objection can be made to Mr. Spencer on that ground. But to say "Time and Space are intuitions" is also quite correct, and Mr. Spencer is wrong in censuring the expression.

Why does Mr. Spencer rebuke me so severely on a point which is of no consequence? He appears confident that I have betrayed an unpardonable misconception of Kant's philosophy. But having pointed out by quotations from Kant that this is not so, I shall now proceed to explain why the quotation which Mr. Spencer makes from my article, although the eight words in quotation marks are literally quoted, is a misquotation. It is torn out of its context. I did not blame the English translators of Kant at all, but I blamed his interpreters, among whom the English interpreters (not all English interpreters, but certainly some of them) are the worst, for "mutilating Kant's best thoughts, so that this hero of progress appears as a stronghold of antiquated views"; and as an instance I called attention to the misconception of Kant's term *Anschauung*, saying:

"How different is Kant's philosophy, for instance, if his position with reference to time and space is mistaken! 'Time and Space are our *Anschauung*,' Kant says. But his English translators declare 'Kant maintained that space and time are in-

tuitions.' What a difference it makes if intuition is interpreted in the sense applied to it by the English intuitionalist school instead of its being taken in the original meaning of the word *Anschauung*."

The word "intuition" implies something mysterious; the word *Anschauung* denotes that which is immediately perceived, simply, as it were, by looking at it. So especially the sense-perceptions of the things before us are *Anschauungen*.

Mr. Spencer, believing that he had caught me in making unawares a blunder, tears the passage out of its context, ignores its purport, makes a point of an antithesis which had nothing in the world to do with the topic under discussion, only to throw on me the opprobrium of incompetence. Even if Mr. Spencer's antithesis of "intuition" and "forms of intuition" were of any consequence (as, unfortunately for Mr. Spencer, it is not), it would count for nothing against me because I did not speak of "forms" in the passage referred to, I simply alluded to one misinterpretation of the term *Anschauung*, which is quite common among English Kantians. It was not required by the purpose I had in view, to enter into any details as to what kind of *Anschauung* I meant, and an allusion to "form" or to any other subject would have served only to confound the idea which I intended to set forth in the paragraph from which Mr. Spencer quotes.

Misquotation of this kind, into which Mr. Spencer was inveigled by a hasty reading, should be avoided with utmost care, for it involves an insinuation. It leads away from the main point under discussion to side issues, and it misrepresents the author from whom the quotation is made. It insinuates a meaning which the passage does not bear and which was not even thought of in the context out of which it is torn.

Mr. Spencer quotes the passage as if I had preferred the term "intuition" to the term "form of intuition," or at least, as if I had no idea that Kant conceives Time and Space as "forms." Yet Mr. Spencer in trying to make out a point against me betrays his own lack of information. Kant insisted most emphatically on calling the forms of our sensibility (i. e. space and time) "*Anschauungen*."

But Mr. Spencer's case is worse still. While he insists upon the statement that according to the translators of Kant space and time are "forms of intuition," which is at least correct, he uses twice in the very same paragraph the expression that according to Kant "space and time are forms of thought," which is incorrect. The forms of thought according to Kantian terminology are not space and time but the domain of the transcendental logic. Anyone who confounds the two terms "forms of intuition" and "forms of thought" proves himself unable to form a correct opinion on Kant's philosophy. That is just characteristic of Kant that he regards time and space not as thought, nor as forms of thought, but as *Anschauungen* and in contradistinction to sense-intuitions (i. e. sensations) he calls them *reine Anschauungen* or *Formen der Anschauung*.

v.

Mr. Spencer commenting upon his criticism of Kant's idea of a Good Will, says:

"I find that in the above three paragraphs I have done Kant less than justice and more than justice—less, in assuming that his evolutionary view was limited to the genesis of our sidereal system, and more, in assuming that he had not contradicted himself.

"Clearly, I am indebted to Dr. Carus for enabling me to prove that Kant's defence of his theory of 'a good will' is, by his own showing, baseless."

Kant's idea of a good will has nothing to do with evolution, and we can abstain here from discussing whether or not Kant was an evolutionist. Whether evolution is true or not, what difference does it make to the proposition, that a good will is the only thing which can be called good without further qualification (*ohne Einschränkung*)? Pleasure is good, but it is not absolutely good, there are cases in which pleasure is a very bad thing. We must qualify our statement and limit it to special cases. A good will, however, says Kant, is in itself good under all circumstances.

Did Mr. Spencer prove the baselessness of Kant's proposition by proving evolution? Is it inconsistent to believe in evolution and at the same time to regard a good will as absolutely good, as good without reserve or limitation? I think not!

VI.

Mr. Spencer in admitting that "the general drift of the passages quoted makes it tolerably clear that Kant must have believed in the operation of natural causes . . . . in producing organic forms," adds:

"He does not, however, extend the theory of natural genesis to the exclusion of the theory of supernatural genesis."

How does Mr. Spencer prove his statement? Does he quote a passage from Kant which expresses his belief in supernaturalism? No, Mr. Spencer does not quote Kant, and it would be difficult to find a passage to suit that purpose. Mr. Spencer adduces a few unmeaning phrases gleaned at random and torn out of their context, and from these phrases he concludes that Kant believed in the supernatural. Kant spoke somewhere of "the wisdom of nature" who has things so arranged that the species might be preserved. If the wisdom of nature in preserving the species is to be taken literally, the phrase might prove that Kant believed nature to be a wise old woman. Kant spoke further of "the germ of reason placed in man whereby he is destined to social intercourse." Does the usage of the word "destined" really "imply divine intervention," as Mr. Spencer says? Mr. Spencer adds:

"And this [viz. Kant's usage of these phrases] shows that I was justified in ascribing to him the belief that Space and Time, as forms of thought [sic!], are supernatural endowments."

What might we not prove by this kind of loose argumentation!

Kant did not introduce any supernatural explanations; on the contrary, he proposed to exclude "supernatural genesis." He says e. g. in a passage of the "Critique of Judgment" quoted on page 41 of the appendix:

"If we assume occasionalism for the production of organised beings, nature is thereby wholly discarded . . . . therefore it cannot be supposed that this system is accepted by anyone who has had to do with philosophy."

And furthermore Kant rejects the partial admission of the supernatural, saying:

"As though it were not the same to make the required forms arise in a supernatural manner at the beginning of the world as during its progress."

Mr. Spencer charges Kant with inconsistency. We do not intend to say that Kant was in all the phases of his development consistent with himself. But we do say that the charge of Mr. Spencer against Kant consists in this: the real Kant has said things which are incompatible with Mr. Spencer's view of Kant.

This settles the sixth point.

VII.

Mr. Spencer's reply to my criticism is a very strange piece of controversy and I have actually been at a loss, how to account for it.

The situation can be explained only by assuming that Mr. Spencer, being an impatient reader, when finding out that he disagreed with my propositions, could go no further and wrote his reply to me without having read my articles. This is very hard on a critic who, carefully avoiding everything that might look like fault-finding, is painstakingly careful in giving to the author criticised every means of investigating the truth himself and helps him in a friendly way to correct his errors.

There is only one consolation for me, which is, that I am in good company. The great thinker of Koenigsberg is very severely censured in almost all of Mr. Spencer's writings for ideas which he never held. And now Mr. Spencer confesses openly and with ingenuous sincerity, that his knowledge of Kant's writings is extremely limited. But why he condemns a man of whom he knows so little Mr. Spencer does not tell us.

Mr. Spencer says:

"My knowledge of Kant's writings is extremely limited. In 1844 a translation of his "Critique of Pure Reason" (then I think lately published) fell into my hands, and I read the first few pages enunciating his doctrine of Time and Space: my peremptory rejection of which caused me to lay the book down.

"Twice since then the same thing has happened; for, being an impatient reader, when I disagree with the cardinal propositions of a work I can go no further.

"One other thing I knew. By indirect references I was made aware that Kant had propounded the idea that celestial bodies have been formed by the aggregation of diffused matter. Beyond this my knowledge of his conceptions did not extend; and my supposition that his evolutionary conception had stopped short with the genesis of sun, stars, and planets was due to the fact that his doctrine of Time and

Space, as forms of thought [sic] anteceding experience, implied a supernatural origin inconsistent with the hypothesis of natural genesis."

Kant has been a leader in thought for the last century. It is very important to criticise his ideas wherever they are wrong, but his errors cannot be conquered by *ex cathedra* denunciations.

Darwin's habits in investigating and weighing the pro and con of a question were very different from Mr. Spencer's, and Darwin's success is in no small degree due to the sternness with which he adhered to certain rules of reading and studying. We find in his "Autobiography" certain reminiscences labeled "important" from which the following is most instructive:

"I had also, during many years, followed a golden rule, namely, that whenever a published fact, a new observation or a thought, came across me, which was opposed to my general results, to make a memorandum of it without fail, for I had found by experience that such facts and thoughts were far more apt to escape from the memory than favorable ones."

Experience teaches that we can learn most from those authors with whom we do not agree. The ethics of reading and studying demand other habits than laying a book down when we disagree with its cardinal propositions. Such habits prevent progress and create prejudices.

* * *

Mr. Spencer has not answered my criticism at all. Mr. Spencer did not even take into consideration the passages quoted from Kant. He republished all the false statements of Kant's views, so inconsiderately made, together with all the perverse opinions based upon them. The assurance with which Mr. Spencer makes statements which have no foundation whatever is really perplexing even to a man who is well informed on the subject, and it will go far to convince the unwary reader. What, however, shall become of the general tenor of philosophical criticism and controversy if a man of Mr. Spencer's reputation is so indifferent about being informed concerning the exact views of his adversary, if he is so careless in presenting them, if he makes positively erroneous statements on confessedly mere "supposition," and finally, if in consequence thereof

he is flagrantly unjust in censuring errors which arise only from his own too prolific imagination?

We feel confident that Mr. Spencer will explain his side of the question satisfactorily. His mistakes being undeniable, we do not believe that he will seek to deny them. Yet we trust that Mr. Spencer as soon as he finds himself at fault, will not even make an attempt at palliation, that he will not blink the frank acknowledgment of his misstatements and also of having treated Kant with injustice. A man who has devoted his life to the search for truth will not suffer any blot to remain on his escutcheon.

EDITOR.

WHAT DOES ANSCHAUUNG MEAN?

MR. SPENCER'S erroneous statement that Kant conceives space and time as forms of thought instead of forms of intuition induces me to make a few explanatory remarks concerning the term *Anschauung*.

Kant means that space and time are immediately given in experience and not inferences drawn from the data of experience; they are not thoughts, but objects of direct perception.

Sense-impressions are data, they are prior to ideas, the latter being constructions made out of sense-impressions. Sense-impressions are facts, but ideas are of an inferential nature; they are (to use Lloyd Morgan's excellent term) constructs. Now Kant claims that space and time are in the same predicament: they also are immediately given, they also are *Anschauungen*. Kant did not trouble himself much to prove that they are forms; he seems to have taken that for granted. But he was very careful to show that they are not ideas, not thoughts, not abstractions, not generalisations, but that they are as direct data as are sense-impressions and he calls the knowledge which man has by directly facing the object of knowledge "*Anschauung*."

The conclusion which Kant draws from this may be characterised as follows:

Sensations are not things but appearances; they are subjective, not objective, they are not the objects themselves but what our sensibility makes of objects. Space and time being *Anschauungen*, Kant argues that they are of the same kind as the sense-data of knowledge, that they are inherent in our nature. Thus Kant maintains:

"Sensations are the products of our sensibility, and space and time are the forms of our sensibility."

The word *Anschauung* has been a *crux interpretum* since translations have been made from Kant, and it is quite true that no adequate word to express it, exists in English. I enjoyed of late a discussion on the subject with Mr. Francis C. Russell who called my attention to several notes in *The Journal of Speculative Philosophy*. The following is from the pen of Dr. W. T. Harris (Vol. II, p. 191):

"Through a singular chance, the present number of the Journal contains two notes from two contributors on the proper translation of the German word *Anschauung*. Mr. Kroeger holds that the word *Anschauung*, as used by Fichte and also by Kant, denotes an act of the Ego which the English word *Intuition* does not at all express, but for which the English word 'contemplation' is an exact equivalent. Mr. Peirce suggests that no person whose native tongue is English will translate *Anschauung* by another word than *Intuition*. Whether there is a failure to understand English on the one hand or German on the other, the Editor does not care to inquire. It is certain that while intuition has been adopted generally as an equivalent for the word under consideratien both by English and French translators, yet it was a wide departure from the ordinary English use of the term. Besides this, we have no English verb *intuite* (at least in the Dictionaries), and the reader will find that the verb used by Meiklejohn (in the translation of Kant's *Kritik*) for it, is *contemplate*, and the same rendering is given by Smith in his excellent translation of Fichte's Popular Works (London, 1849)."

Mr. Charles S. Peirce says:

"No person whose native tongue is English will need to be informed that contemplation is essentially (1) protracted (2) voluntary, and (3) an action, and that it is never used for that which is set forth to the mind in this act. A foreigner can convince himself of this by the proper study of English writers. Thus, Locke (Essay concerning Human Understanding, Book II., chap. 19, § 1) says, 'If it [an idea] be held there [in view] long under attentive consideration, 'tis *contemplation*";; and again, (*Ibid.*, Book II., chap. 10, § 1) 'Keeping the *Idea*, which is brought into it [the mind] for some time actually in view, which is called *Contemplation*.' This term is therefore unfitted to translate *Anschauung;* for this latter does not imply an act which is necessarily protracted or voluntary, and denotes most usually a mental presentation, sometimes a faculty, less often the reception of an impression in the mind, and seldom, if ever, an action.

"To the translation of *Anschauung* by intuition, there is, at least, no such insufferable objection. Etymologically the two words precisely correspond. The original philosophical meaning of intuition was a cognition of the present manifold in that character; and it is now commonly used, as a modern writer says, 'to in-

clude all the products of the perceptive (external or internal) and imaginative faculties; every act of consciousness, in short, of which the immediate object is an *individual*, thing, act, or state of mind, presented under the condition of distinct existence in space and time.' Finally, we have the authority of Kant's own example for translating his *Anschauung* by *Intuitus;* and, indeed, this is the common usage of Germans writing Latin. Moreover, *intuitiv* frequently replaces *anschauend* or *anschaulich*. If this constitutes a misunderstanding of Kant, it is one which is shared by himself and nearly all his countrymen" (*ibid.* p. 152 et seqq).

Mr. Peirce adds the following explanation concerning the term intuition in another note (*ibid.* p. 103):

"The word *intuitus* first occurs as a technical term in St. Anselm's Monologium. He wished to distinguish between our knowledge of God and our knowledge of finite things (and, in the next world, of God, also); and thinking of the saying of St. Paul, *Videmus nunc per speculum in ænigmate: tunc autem facie ad faciem*, he called the former *speculation* and the latter *intuition*. This use of 'speculation' did not take root, because that word already had another exact and widely different meaning.

"In the middle ages, the term 'intuitive cognition' had two principal senses, 1st, as opposed to abstractive cognition, it meant the knowledge of the present as present, and this is its meaning in Anselm; but 2d, as no intuitive cognition was allowed to be determined by a previous cognition, it came to be used as the opposite of discursive cognition (see Scotus, In sentent. lib. 2, dist. 3, qu. 9), and this is nearly the sense in which I employ it. This is also nearly the sense in which Kant uses it, the former distinction being expressed by his *sensuous* and *non-sensuous*. (See Werke, herausg. Rosenkrantz, Thl. 2, S. 713, 31, 41, 100, u. s. w.)

"An enumeration of six meanings of intuition may be found in Hamilton's Reid p. 759."

If we have to choose between the two translations "intuition" and "contemplation," we should with Mr. Peirce decidedly prefer the word "intuition." The word contemplation corresponds to the German *Betrachtung* and all that Mr. Peirce says against it holds good. But we must confess that the term intuition (as Mr. Peirce himself seems to grant) is not a very good translation either. The term intuition has other meanings which interfere with the correct meaning of *Anschauung* and was actually productive of much confusion.

The English term intuition is strongly tinged with the same meaning that is attached to the German word *Intuition*. It means an inexplicable kind of direct information from some supernatural sources, which mystics claim to possess as the means of their rev-

elations. In this sense Goethe characterises it satirically in Faust (Scene XIV). Mephistopheles describes the process as follows:

> A blessing drawn from supernatural fountains!
> In night and dew to lie upon the mountains;
> All Heaven and Earth in rapture penetrating;
> Thyself to Godhood haughtily inflating;
> To grub with yearning force through Earth's dark marrow,
> Compress the six days' work within thy bosom narrow,—
> To taste, I know not what, in haughty power,
> Thine own ecstatic life on all things shower,
> Thine earthly self behind thee cast,
> And then the lofty intuition [with a gesture] at last.

The satire is good on *Intuition* but it would not apply to *Anschauung*, for the latter word excludes rigidly any mysticism or supernaturalism which the former essentially involves. To employ the term "intuition" for both ideas must necessarily weaken the meaning of *Anschauung*.

Besides we should bear in mind that the German *Anschauung* is vernacular and should find a correspondent Saxon word. Such Latin words as intuition convey in English as much as in German the impression of being terms denoting something very abstract. Vernacular terms much more strongly indicate the immediateness and directness which is implied in *Anschauung*. In my conversation with Mr. Russell, we tried to coin a new word that should cover the meaning of *Anschauung* as an act of "atlooking" and the word "atsight" readily suggested itself.

The word "atsight" is an exact English equivalent of the German *Anschauung*. It describes the looking at an object in its immediate presence. At the same time the word is readily understood, while philologically considered, its formation is fully justified by the existence of the words "insight and foresight."

* * *

One of the most important of Kant's doctrines is the proposition that all thought must ultimately have reference to *Anschauung*, i. e. to atsight. Through atsight only the objects of experience can be given us. All speculations not founded upon this bottom rock of knowledge are mere dreams. This is the maxim of positivism and

it is the basis of all sound philosophy. Says Kant in the "Anhang" to his Prolegomena (in reply to a critic who had misunderstood his idealism) as a summary statement of his views:

"*Der Satz aller echten Idealisten, von der eleatischen Schule an bis zum Bischof Berkley, ist in dieser Formel enthalten: 'alle Erkenntnis durch Sinne und Erfahrung ist nichts als lauter Schein, und nur in den Ideen des reinen Verstandes und Vernunft ist Wahrheit.'*

"*Der Grundsatz, der meinen Idealismus durchgängig regiert und bestimmt, ist dagegen: 'Alles Erkenntnis von Dingen, aus blossem reinen Verstande oder reiner Vernunft, ist nichts als lauter Schein, und nur in der Erfahrung ist Wahrheit.'*"

"The doctrine of all genuine idealists from the Eleatic School down to Bishop Berkeley is contained in this formula: All cognition through the senses and experience is nothing but illusion; and in the ideas of the pure understanding and reason alone is truth.

"The principle, however, that rules and determines my idealism throughout is this: All cognition out of pure understanding or pure reason is nothing but mere illusion and in experience alone is truth."

Kant then proposes in order to avoid equivocation to call his views "formal or critical idealism," adding that his idealism made any other idealism impossible. Criticism truly is the beginning of philosophy as an objective science. It gives the *coup de grace* to those worthless declamations which still pass among many as philosophy. Says Kant:

"*So viel ist gewiss: wer einmal Kritik gekostet hat, den ekelt auf immer alles dogmatische Gewäsche.*"

"That much is certain: He who has once tasted critique will be forever disgusted with all dogmatic twaddle."

It is strange that in spite of Kant's explicit declaration, which leaves no doubt about the positive spirit that pervades the principles of his philosophy, he is still misunderstood by his opponents no less than by those who profess to be his disciples.

* * *

There is no occasion now to treat the subject exhaustively, but it may be permitted to add a few remarks on Kant's proposition that space and time are atsights.

We must distinguish three things:

1) Objective space.

2) Space as atsight, and

3) Space-conception.

Space as atsight is the datum. It is the immediate presence of relations among the sensory impressions. This, however, is not as yet that something which we generally call space. That which generally goes by the name of space is a construction built out of the relational data that obtain in experience and we propose to call it space-conception. Our space-conception, accordingly, (and here I include the mathematician's space-conception) is based upon space as atsight, but it is more than atsight. It is an inference made therefrom, it is the product of experience. Space-conception, however, is as are all legitimate noumena, no mere subjective illusion, it possesses objective validity; it describes some real existence and this real existence represented in space-conception is what may be called objective space.

Objective space is the form of reality. Space as atsight is the form of sensibility. Space as space-conception is a construct of an abstract nature and serves as a description or plan of the form of reality.

The same is true of Time. Time as atsight is the relation of succession obtaining in the changes of experience. Time as time-conception is the noumenon constructed out of these data to represent that feature of reality which may for lack of a better term be called objective time.

Briefly: Space and Time are not things, not essences, not entities, but certain features of existence. They are the forms of reality. When existence finds a representation in the feelings of a sentient being, time and space appear as their forms, and these forms furnish the material out of which are built the conceptions of Space and Time.

EDITOR.

THE LAW OF MIND.

IN an article published in *The Monist* for January 1891, I endeavored to show what ideas ought to form the warp of a system of philosophy, and particularly emphasised that of absolute chance. In the number of April 1892, I argued further in favor of that way of thinking, which it will be convenient to christen *tychism* (from τύχη, chance). A serious student of philosophy will be in no haste to accept or reject this doctrine; but he will see in it one of the chief attitudes which speculative thought may take, feeling that it is not for an individual, nor for an age, to pronounce upon a fundamental question of philosophy. That is a task for a whole era to work out. I have begun by showing that *tychism* must give birth to an evolutionary cosmology, in which all the regularities of nature and of mind are regarded as products of growth, and to a Schelling-fashioned idealism which holds matter to be mere specialised and partially deadened mind. I may mention, for the benefit of those who are curious in studying mental biographies, that I was born and reared in the neighborhood of Concord,—I mean in Cambridge,—at the time when Emerson, Hedge, and their friends were disseminating the ideas that they had caught from Schelling, and Schelling from Plotinus, from Boehm, or from God knows what minds stricken with the monstrous mysticism of the East. But the atmosphere of Cambridge held many an antiseptic against Concord transcendentalism; and I am not conscious of having contracted any of that virus. Nevertheless, it is probable that some cultured bacilli, some benignant form of the disease was implanted in my soul, unawares, and that now, after long incubation, it comes to the surface, modified by

mathematical conceptions and by training in physical investigations.

The next step in the study of cosmology must be to examine the general law of mental action. In doing this, I shall for the time drop my tychism out of view, in order to allow a free and independent expansion to another conception signalised in my first *Monist*-paper as one of the most indispensable to philosophy, though it was not there dwelt upon ; I mean the idea of continuity. The tendency to regard continuity, in the sense in which I shall define it, as an idea of prime importance in philosophy may conveniently be termed *synechism*. The present paper is intended chiefly to show what synechism is, and what it leads to. I attempted, a good many years ago, to develop this doctrine in the *Journal of Speculative Philosophy* (Vol. III.); but I am able now to improve upon that exposition, in which I was a little blinded by nominalistic prepossessions. I refer to it, because students may possibly find that some points not sufficiently explained in the present paper are cleared up in those earlier ones.

WHAT THE LAW IS.

Logical analysis applied to mental phenomena shows that there is but one law of mind, namely, that ideas tend to spread continuously and to affect certain others which stand to them in a peculiar relation of affectibility. In this spreading they lose intensity, and especially the power of affecting others, but gain generality and become welded with other ideas.

I set down this formula at the beginning, for convenience ; and now proceed to comment upon it.

INDIVIDUALITY OF IDEAS.

We are accustomed to speak of ideas as reproduced, as passed from mind to mind, as similar or dissimilar to one another, and, in short, as if they were substantial things ; nor can any reasonable objection be raised to such expressions. But taking the word "idea" in the sense of an event in an individual consciousness, it is clear that an idea once past is gone forever, and any supposed recurrence of it is another idea. These two ideas are not present in the same

state of consciousness, and therefore cannot possibly be compared. To say, therefore, that they are similar can only mean that an occult power from the depths of the soul forces us to connect them in our thoughts after they are both no more. We may note, here, in passing that of the two generally recognised principles of association, contiguity and similarity, the former is a connection due to a power without, the latter a connection due to a power within.

But what can it mean to say that ideas wholly past are thought of at all, any longer? They are utterly unknowable. What distinct meaning can attach to saying that an idea in the past in any way affects an idea in the future, from which it is completely detached? A phrase between the assertion and the denial of which there can in no case be any sensible difference is mere gibberish.

I will not dwell further upon this point, because it is a commonplace of philosophy.

CONTINUITY OF IDEAS.

We have here before us a question of difficulty, analogous to the question of nominalism and realism. But when once it has been clearly formulated, logic leaves room for one answer only. How can a past idea be present? Can it be present vicariously? To a certain extent, perhaps; but not merely so; for then the question would arise how the past idea can be related to its vicarious representation. The relation, being between ideas, can only exist in some consciousness: now that past idea was in no consciousness but that past consciousness that alone contained it; and that did not embrace the vicarious idea.

Some minds will here jump to the conclusion that a past idea cannot in any sense be present. But that is hasty and illogical. How extravagant, too, to pronounce our whole knowledge of the past to be mere delusion! Yet it would seem that the past is as completely beyond the bonds of possible experience as a Kantian thing-in-itself.

How can a past idea be present? Not vicariously. Then, only by direct perception. In other words, to be present, it must be *ipso facto* present. That is, it cannot be wholly past; it can only be

going, infinitesimally past, less past than any assignable past date. We are thus brought to the conclusion that the present is connected with the past by a series of real infinitesimal steps.

It has already been suggested by psychologists that consciousness necessarily embraces an interval of time. But if a finite time be meant, the opinion is not tenable. If the sensation that precedes the present by half a second were still immediately before me, then, on the same principle the sensation preceding that would be immediately present, and so on *ad infinitum*. Now, since there is a time, say a year, at the end of which an idea is no longer *ipso facto* present, it follows that this is true of any finite interval, however short.

But yet consciousness must essentially cover an interval of time; for if it did not, we could gain no knowledge of time, and not merely no veracious cognition of it, but no conception whatever. We are, therefore, forced to say that we are immediately conscious through an infinitesimal interval of time.

This is all that is requisite. For, in this infinitesimal interval, not only is consciousness continuous in a subjective sense, that is, considered as a subject or substance having the attribute of duration; but also, because it is immediate consciousness, its object is *ipso facto* continuous. In fact, this infinitesimally spread-out consciousness is a direct feeling of its contents as spread out. This will be further elucidated below. In an infinitesimal interval we directly perceive the temporal sequence of its beginning, middle, and end,—not, of course, in the way of recognition, for recognition is only of the past, but in the way of immediate feeling. Now upon this interval follows another, whose beginning is the middle of the former, and whose middle is the end of the former. Here, we have an immediate perception of the temporal sequence of its beginning, middle, and end, or say of the second, third, and fourth instants. From these two immediate perceptions, we gain a mediate, or inferential, perception of the relation of all four instants. This mediate perception is objectively, or as to the object represented, spread over the four instants; but subjectively, or as itself the subject of duration, it is completely embraced in the second moment. [The reader will observe that I use the word *instant* to mean a point

of time, and *moment* to mean an infinitesimal duration.] If it is objected that, upon the theory proposed, we must have more than a mediate perception of the succession of the four instants, I grant it; for the sum of the two infinitesimal intervals is itself infinitesimal, so that it is immediately perceived. It is immediately perceived in the whole interval, but only mediately perceived in the last two thirds of the interval. Now, let there be an indefinite succession of these inferential acts of comparative perception; and it is plain that the last moment will contain objectively the whole series. Let there be, not merely an indefinite succession, but a continuous flow of inference through a finite time; and the result will be a mediate objective consciousness of the whole time in the last moment. In this last moment, the whole series will be recognised, or known as known before, except only the last moment, which of course will be absolutely unrecognisable to itself. Indeed, even this last moment will be recognised like the rest, or, at least be just beginning to be so. There is a little *elenchus*, or appearance of contradiction, here, which the ordinary logic of reflection quite suffices to resolve.

INFINITY AND CONTINUITY, IN GENERAL.

Most of the mathematicians who during the last two generations have treated the differential calculus have been of the opinion that an infinitesimal quantity is an absurdity; although, with their habitual caution, they have often added "or, at any rate, the conception of an infinitesimal is so difficult, that we practically cannot reason about it with confidence and security." Accordingly, the doctrine of limits has been invented to evade the difficulty, or, as some say, to explain the signification of the word "infinitesimal." This doctrine, in one form or another, is taught in all the text-books, though in some of them only as an alternative view of the matter; it answers well enough the purposes of calculation, though even in that application it has its difficulties.

The illumination of the subject by a strict notation for the logic of relatives had shown me clearly and evidently that the idea of an infinitesimal involves no contradiction, before I became acquainted with the writings of Dr. Georg Cantor (though many of these had

already appeared in the *Mathematische Annalen* and in *Borchardt's Journal*, if not yet in the *Acta Mathematica*, all mathematical journals of the first distinction), in which the same view is defended with extraordinary genius and penetrating logic.

The prevalent opinion is that finite numbers are the only ones that we can reason about, at least, in any ordinary mode of reasoning, or, as some authors express it, they are the only numbers that can be reasoned about mathematically. But this is an irrational prejudice. I long ago showed that finite collections are distinguished from infinite ones only by one circumstance and its consequences, namely, that to them is applicable a peculiar and unusual mode of reasoning called by its discoverer, De Morgan, the "syllogism of transposed quantity."

Balzac, in the introduction of his *Physiologie du mariage*, remarks that every young Frenchman boasts of having seduced some Frenchwoman. Now, as a woman can only be seduced once, and there are no more Frenchwomen than Frenchmen, it follows, if these boasts are true, that no French women escape seduction. If their number be finite, the reasoning holds. But since the population is continually increasing, and the seduced are on the average younger than the seducers, the conclusion need not be true. In like manner, De Morgan, as an actuary, might have argued that if an insurance company pays to its insured on an average more than they have ever paid it, including interest, it must lose money. But every modern actuary would see a fallacy in that, since the business is continually on the increase. But should war, or other cataclysm, cause the class of insured to be a finite one, the conclusion would turn out painfully correct, after all. The above two reasonings are examples of the syllogism of transposed quantity.

The proposition that finite and infinite collections are distinguished by the applicability to the former of the syllogism of transposed quantity ought to be regarded as the basal one of scientific arithmetic.

If a person does not know how to reason logically, and I must say that a great many fairly good mathematicians,—yea distinguished ones,—fall under this category, but simply uses a rule of

thumb in blindly drawing inferences like other inferences that have turned out well, he will, of course, be continually falling into error about infinite numbers. The truth is such people do not reason, at all. But for the few who do reason, reasoning about infinite numbers is easier than about finite numbers, because the complicated syllogism of transposed quantity is not called for. For example, that the whole is greater than its part is not an axiom, as that eminently bad reasoner, Euclid, made it to be. It is a theorem readily proved by means of a syllogism of transposed quantity, but not otherwise. Of finite collections it is true, of infinite collections false. Thus, a part of the whole numbers are even numbers. Yet the even numbers are no fewer than all the numbers; an evident proposition since if every number in the whole series of whole numbers be doubled, the result will be the series of even numbers.

1, 2, 3, 4, 5, 6, etc.
2, 4, 6, 8, 10, 12, etc.

So for every number there is a distinct even number. In fact, there are as many distinct doubles of numbers as there are of distinct numbers. But the doubles of numbers are all even numbers.

In truth, of infinite collections there are but two grades of magnitude, the *endless* and the *innumerable*. Just as a finite collection is distinguished from an infinite one by the applicability to it of a special mode of reasoning, the syllogism of transposed quantity, so, as I showed in the paper last referred to, a numerable collection is distinguished from an innumerable one by the applicability to it of a certain mode of reasoning, the Fermatian inference, or, as it is sometimes improperly termed, "mathematical induction."

As an example of this reasoning, Euler's demonstration of the binomial theorem for integral powers may be given. The theorem is that $(x+y)^n$, where n is a whole number, may be expanded into the sum of a series of terms of which the first is $x^n y^0$ and each of the others is derived from the next preceding by diminishing the exponent of x by 1 and multiplying by that exponent and at the same time increasing the exponent of y by 1 and dividing by that increased exponent. Now, suppose this proposition to be true for a certain exponent, $n = M$, then it must also be true for $n = \mathrm{M} + 1$.

For let one of the terms in the expansion of $(x+y)^M$ be written $Ax^p y^q$. Then, this term with the two following will be

$$A\,x^p y^q + A\frac{p}{q+1}\,x^{p-1}y^{q+1} + A\frac{p}{q+1}\frac{p-1}{q+2}\,x^{p-2}y^{q+2}$$

Now, when $(x+y)^M$ is multiplied by $x+y$ to give $(x+y)^{M+1}$, we multiply first by x and then by y instead of by x and add the two results. When we multiply by x, the second of the above three terms will be the only one giving a term involving $x^p y^{q+1}$ and the third will be the only one giving a term in $x^{p-1}y^{q+2}$; and when we multiply by y the first will be the only term giving a term in $x^p y^{q+1}$, and the second will be the only term giving a term in $x^{p-1}y^{q+2}$. Hence, adding like terms, we find that the coefficient of $x^p y^{q+1}$ in the expansion of $(x+y)^{M+1}$ will be the sum of the coefficients of the first two of the above three terms, and that the coefficient of $x^{p-1}y^{q+2}$ will be the sum of the coefficients of the last two terms. Hence, two successive terms in the expansion of $(x+y)^{M+1}$ will be

$$A\left[1+\frac{p}{q+1}\right]x^p y^{q+1} + A\frac{p}{q+1}\left[1+\frac{p-1}{q+2}\right]x^{p-1}y^{q+2}$$

$$= A\frac{p+q+1}{q+1}\,x^p y^{q+1} + A\frac{p+q+1}{q+1}\cdot\frac{p}{q+2}\,x^{p-1}y^{q+2}.$$

It is, thus, seen that the succession of terms follows the rule. Thus if any integral power follows the rule, so also does the next higher power. But the first power obviously follows the rule. Hence, all powers do so.

Such reasoning holds good of any collection of objects capable of being ranged in a series which though it may be endless, can be numbered so that each member of it receives a definite integral number. For instance, all the whole numbers constitute such a numerable collection. Again, all numbers resulting from operating according to any definite rule with any finite number of whole numbers form such a collection. For they may be arranged in a series thus. Let F be the symbol of operation. First operate on 1, giving F(1). Then, operate on a second 1, giving F(1,1). Next, introduce 2, giving 3rd, F(2); 4th, F(2,1); 5th, F(1,2); 6th, F(2,2). Next use a third variable giving 7th, F(1,1,1); 8th, F(2,1,1); 9th, F(1,2,1); 10th, F(2,2,1); 11th, F(1,1,2); 12th, F(2,1,2); 13th, F(1,2,2);

14th, F(2,2,2). Next introduce 3, and so on, alternately introducing new variables and new figures; and in this way it is plain that every arrangement of integral values of the variables will receive a numbered place in the series.*

The class of endless but numerable collections (so called because they can be so ranged that to each one corresponds a distinct whole number) is very large. But there are collections which are certainly innumerable. Such is the collection of all numbers to which endless series of decimals are capable of approximating. It has been recognised since the time of Euclid that certain numbers are surd or incommensurable, and are not exactly expressible by any finite series of decimals, nor by a circulating decimal. Such is the ratio of the circumference of a circle to its diameter, which we know is nearly 3.1415926. The calculation of this number has been carried to over 700 figures without the slightest appearance of regularity in their sequence. The demonstrations that this and many other numbers are incommensurable are perfect. That the entire collection of incommensurable numbers is innumerable has been clearly proved by Cantor. I omit the demonstration; but it is easy to see that to discriminate one from some other would, in general, require the use of an endless series of numbers. Now if they cannot be exactly expressed and discriminated, clearly they cannot be ranged in a linear series.

It is evident that there are as many points on a line or in an interval of time as there are of real numbers in all. These are, therefore, innumerable collections. Many mathematicians have incautiously assumed that the points on a surface or in a solid are more than those on a line. But this has been refuted by Cantor. Indeed, it is obvious that for every set of values of coördinates there is a single distinct number. Suppose, for instance, the values of the coördinates all lie between 0 and + 1. Then if we compose a number by putting in the first decimal place the first figure of the first coördinate, in the second the first figure of the second coördi-

* This proposition is substantially the same as a theorem of Cantor, though it is enunciated in a much more general form.

nate, and so on, and when the first figures are all dealt out go on to the second figures in like manner, it is plain that the values of the coördinates can be read off from the single resulting number, so that a triad or tetrad of numbers, each having innumerable values, has no more values than a single incommensurable number.

Were the number of dimensions infinite, this would fail; and the collection of infinite sets of numbers having each innumerable variations, might, therefore, be greater than the simple innumerable collection, and might be called *endlessly infinite*. The single individuals of such a collection could not, however, be designated, even approximately, so that this is indeed a magnitude concerning which it would be possible to reason only in the most general way, if at all.

Although there are but two grades of magnitudes of infinite collections, yet when certain conditions are imposed upon the order in which individuals are taken, distinctions of magnitude arise from that cause. Thus, if a simply endless series be doubled by separating each unit into two parts, the successive first parts and also the second parts being taken in the same order as the units from which they are derived, this double endless series will, so long as it is taken in that order, appear as twice as large as the original series. In like manner the product of two innumerable collections, that is, the collection of possible pairs composed of one individual of each, if the order of continuity is to be maintained, is, by virtue of that order, infinitely greater than either of the component collections.

We now come to the difficult question, What is continuity? Kant confounds it with infinite divisibility, saying that the essential character of a continuous series is that between any two members of it a third can always be found. This is an analysis beautifully clear and definite; but unfortunately, it breaks down under the first test. For according to this, the entire series of rational fractions arranged in the order of their magnitude, would be an infinite series, although the rational fractions are numerable, while the points of a line are innumerable. Nay, worse yet, if from that series of fractions any two with all that lie between them be excised, and any number of such finite gaps he made, Kant's definition is still true of the series, though it has lost all appearance of continuity.

Cantor defines a continuous series as one which is *concatenated* and *perfect*. By a concatenated series, he means such a one that if any two points are given in it, and any finite distance, however small, it is possible to proceed from the first point to the second through a succession of points of the series each at a distance from the preceding one less than the given distance. This is true of the series of rational fractions ranged in the order of their magnitude. By a perfect series, he means one which contains every point such that there is no distance so small that this point has not an infinity of points of the series within that distance of it. This is true of the series of numbers between 0 and 1 capable of being expressed by decimals in which only the digits 0 and 1 occur.

It must be granted that Cantor's definition includes every series that is continuous; nor can it be objected that it includes any important or indubitable case of a series not continuous. Nevertheless, it has some serious defects. In the first place, it turns upon metrical considerations; while the distinction between a continuous and a discontinuous series is manifestly non-metrical. In the next place, a perfect series is defined as one containing "every point" of a certain description. But no positive idea is conveyed of what all the points are: that is definition by negation, and cannot be admitted. If that sort of thing were allowed, it would be very easy to say, at once, that the continuous linear series of points is one which contains every point of the line between its extremities. Finally, Cantor's definition does not convey a distinct notion of what the components of the conception of continuity are. It ingeniously wraps up its properties in two separate parcels, but does not display them to our intelligence.

Kant's definition expresses one simple property of a continuum; but it allows of gaps in the series. To mend the definition, it is only necessary to notice how these gaps can occur. Let us suppose, then, a linear series of points extending from a point, A, to a point, B, having a gap from B to a third point, C, and thence extending to a final limit, D; and let us suppose this series conforms to Kant's definition. Then, of the two points, B and C, one or both must be excluded from the series; for otherwise, by the definition, there

would be points between them. That is, if the series contains *C*, though it contains all the points up to *B*, it cannot contain *B*. What is required, therefore, is to state in non-metrical terms that if a series of points up to a limit is included in a continuum the limit is included. It may be remarked that this is the property of a continuum to which Aristotle's attention seems to have been directed when he defines a continuum as something whose parts have a common limit. The property may be exactly stated as follows: If a linear series of points is continuous between two points, *A* and *D*, and if an endless series of points be taken, the first of them between *A* and *D* and each of the others between the last preceding one and *D*, then there is a point of the continuous series between all that endless series of points and *D*, and such that every other point of which this is true lies between this point and *D*. For example, take any number between 0 and 1, as 0.1; then, any number between 0.1 and 1, as 0.11; then any number between 0.11 and 1, as 0.111; and so on, without end. Then, because the series of real numbers between 0 and 1 is continuous, there must be a *least* real number, greater than every number of that endless series. This property, which may be called the Aristotelicity of the series, together with Kant's property, or its Kanticity, completes the definition of a continuous series.

The property of Aristotelicity may be roughly stated thus: a continuum contains the end point belonging to every endless series of points which it contains. An obvious corollary is that every continuum contains its limits. But in using this principle it is necessary to observe that a series may be continuous except in this, that it omits one or both of the limits.

Our ideas will find expression more conveniently if, instead of points upon a line, we speak of real numbers. Every real number is, in one sense, the limit of a series, for it can be indefinitely approximated to. Whether every real number is a limit of a *regular* series may perhaps be open to doubt. But the series referred to in the definition of Aristotelicity must be understood as including all series whether regular or not. Consequently, it is implied that between any two points an innumerable series of points can be taken.

Every number whose expression in decimals requires but a finite number of places of decimals is commensurable. Therefore, incommensurable numbers suppose an infinitieth place of decimals. The word infinitesimal is simply the Latin form of infinitieth; that is, it is an ordinal formed from *infinitum*, as centesimal from *centum*. Thus, continuity supposes infinitesimal quantities. There is nothing contradictory about the idea of such quantities. In adding and multiplying them the continuity must not be broken up, and consequently they are precisely like any other quantities, except that neither the syllogism of transposed quantity, nor the Fermatian inference applies to them.

If A is a finite quantity and i an infinitesimal, then in a certain sense we may write $A + i = A$. That is to say, this is so for all purposes of measurement. But this principle must not be applied except to get rid of *all* the terms in the highest order of infinitesimals present. As a mathematician, I prefer the method of infinitesimals to that of limits, as far easier and less infested with snares. Indeed, the latter, as stated in some books, involves propositions that are false; but this is not the case with the forms of the method used by Cauchy, Duhamel, and others. As they understand the doctrine of limits, it involves the notion of continuity, and therefore contains in another shape the very same ideas as the doctrine of infinitesimals.

Let us now consider an aspect of the Aristotelical principle which is particularly important in philosophy. Suppose a surface to be part red and part blue; so that every point on it is either red or blue, and, of course, no part can be both red and blue. What, then, is the color of the boundary line between the red and the blue? The answer is that red or blue, to exist at all, must be spread over a surface; and the color of the surface is the color of the surface in the immediate neighborhood of the point. I purposely use a vague form of expression. Now, as the parts of the surface in the immediate neighborhood of any ordinary point upon a curved boundary are half of them red and half blue, it follows that the boundary is half red and half blue. In like manner, we find it necessary to hold that consciousness essentially occupies time; and what is

present to the mind at any ordinary instant, is what is present during a moment in which that instant occurs. Thus, the present is half past and half to come. Again, the color of the parts of a surface at any finite distance from a point, has nothing to do with its color just at that point; and, in the parallel, the feeling at any finite interval from the present has nothing to do with the present feeling, except vicariously. Take another case: the velocity of a particle at any instant of time is its mean velocity during an infinitesimal instant in which that time is contained. Just so my immediate feeling is my feeling through an infinitesimal duration containing the present instant.

ANALYSIS OF TIME.

One of the most marked features about the law of mind is that it makes time to have a definite direction of flow from past to future. The relation of past to future is, in reference to the law of mind, different from the relation of future to past. This makes one of the great contrasts between the law of mind and the law of physical force, where there is no more distinction between the two opposite directions in time than between moving northward and moving southward.

In order, therefore, to analyse the law of mind, we must begin by asking what the flow of time consists in. Now, we find that in reference to any individual state of feeling, all others are of two classes, those which affect this one (or have a tendency to affect it, and what this means we shall inquire shortly), and those which do not. The present is affectible by the past but not by the future.

Moreover, if state *A* is affected by state *B*, and state *B* by state *C*, then *A* is affected by state *C*, though not so much so. It follows, that if *A* is affectible by *B*, *B* is not affectible by *A*.

If, of two states, each is absolutely unaffectible by the other, they are to be regarded as parts of the same state. They are contemporaneous.

To say that a state is *between* two states means that it affects one and is affected by the other. Between any two states in this sense lies an innumerable series of states affecting one another; and

if a state lies between a given state and any other state which can be reached by inserting states between this state and any third state, these inserted states not immediately affecting or being affected by either, then the second state mentioned immediately affects or is affected by the first, in the sense that in the one the other is *ipso facto* present in a reduced degree.

These propositions involve a definition of time and of its flow. Over and above this definition they involve a doctrine, namely, that every state of feeling is affectible by every earlier state.

THAT FEELINGS HAVE INTENSIVE CONTINUITY.

Time with its continuity logically involves some other kind of continuity than its own. Time, as the universal form of change, cannot exist unless there is something to undergo change, and to undergo a change continuous in time, there must be a continuity of changeable qualities. Of the continuity of intrinsic qualities of feeling we can now form but a feeble conception. The development of the human mind has practically extinguished all feelings, except a few sporadic kinds, sound, colors, smells, warmth, etc., which now appear to be disconnected and disparate. In the case of colors, there is a tridimensional spread of feelings. Originally, all feelings may have been connected in the same way, and the presumption is that the number of dimensions was endless. For development essentially involves a limitation of possibilities. But given a number of dimensions of feeling, all possible varieties are obtainable by varying the intensities of the different elements. Accordingly, time logically supposes a continuous range of intensity in feeling. It follows, then, from the definition of continuity, that when any particular kind of feeling is present, an infinitesimal continuum of all feelings differing infinitesimally from that is present.

THAT FEELINGS HAVE SPATIAL EXTENSION.

Consider a gob of protoplasm, say an amœba or a slime-mould. It does not differ in any radical way from the contents of a nerve-cell, though its functions may be less specialised. There is no

doubt that this slime-mould, or this amœba, or at any rate some similar mass of protoplasm feels. That is to say, it feels when it is in its excited condition. But note how it behaves. When the whole is quiescent and rigid, a place upon it is irritated. Just at this point, an active motion is set up, and this gradually spreads to other parts. In this action, no unity nor relation to a nucleus, or other unitary organ can be discerned. It is a mere amorphous continuum of protoplasm, with feeling passing from one part to another. Nor is there anything like a wave-motion. The activity does not advance to new parts, just as fast as it leaves old parts. Rather, in the beginning, it dies out at a slower rate than that at which it spreads. And while the process is going on, by exciting the mass at another point, a second quite independent state of excitation will be set up. In some places, neither excitation will exist, in others each separately, in still other places, both effects will be added together. Whatever there is in the whole phenomenon to make us think there is feeling in such a mass of protoplasm,—*feeling*, but plainly no *personality*,—goes logically to show that that feeling has a subjective, or substantial, spatial extension, as the excited state has. This is, no doubt, a difficult idea to seize, for the reason that it is a subjective, not an objective, extension. It is not that we have a feeling of bigness; though Professor James, perhaps rightly, teaches that we have. It is that the feeling, as a subject of inhesion, is big. Moreover, our own feelings are focused in attention to such a degree that we are not aware that ideas are not brought to an absolute unity; just as nobody not instructed by special experiment has any idea how very, very little of the field of vision is distinct. Still, we all know how the attention wanders about among our feelings; and this fact shows that those feelings that are not coordinated in attention have a reciprocal externality, although they are present at the same time. But we must not tax introspection to make a phenomenon manifest which essentially involves externality.

Since space is continuous, it follows that there must be an immediate community of feeling between parts of mind infinitesimally near together. Without this, I believe it would have been

impossible for minds external to one another, ever to become co-ordinated, and equally impossible for any coördination to be established in the action of the nerve-matter of one brain.

AFFECTIONS OF IDEAS.

But we are met by the question what is meant by saying that one idea affects another. The unravelment of this problem requires us to trace out phenomena a little further.

Three elements go to make up an idea. The first is its intrinsic quality as a feeling. The second is the energy with which it affects other ideas, an energy which is infinite in the here-and-nowness of immediate sensation, finite and relative in the recency of the past. The third element is the tendency of an idea to bring along other ideas with it.

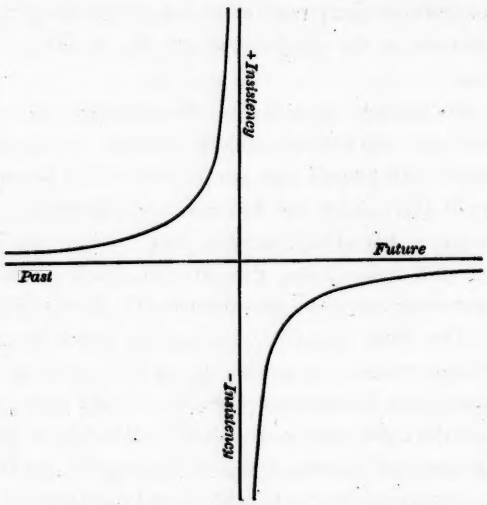
As an idea spreads, its power of affecting other ideas gets rapidly reduced; but its intrinsic quality remains nearly unchanged. It is long years now since I last saw a cardinal in his robes; and my memory of their color has become much dimmed. The color itself, however, is not remembered as dim. I have no inclination to call it a dull red. Thus, the intrinsic quality remains little changed; yet more accurate observation will show a slight reduction of it. The third element, on the other hand, has increased. As well as I can recollect, it seems to me the cardinals I used to see wore robes more scarlet than vermilion is, and highly luminous. Still, I know the color commonly called cardinal is on the crimson side of vermilion and of quite moderate luminosity, and the original idea calls up so many other hues with it, and asserts itself so feebly, that I am unable any longer to isolate it.

A finite interval of time generally contains an innumerable series of feelings; and when these become welded together in association, the result is a general idea. For we have just seen how by continuous spreading an idea becomes generalised.

The first character of a general idea so resulting is that it is living feeling. A continuum of this feeling, infinitesimal in duration, but still embracing innumerable parts, and also, though infinitesimal, entirely unlimited, is immediately present. And in its absence of boundedness a vague possibility of more than is present is directly felt.

Second, in the presence of this continuity of feeling, nominalistic maxims appear futile. There is no doubt about one idea affecting another, when we can directly perceive the one gradually modified and shaping itself into the other. Nor can there any longer be any difficulty about one idea resembling another, when we can pass along the continuous field of quality from one to the other and back again to the point which we had marked.

Third, consider the insistency of an idea. The insistency of a past idea with reference to the present is a quantity which is less the further back that past idea is, and rises to infinity as the past idea



is brought up into coincidence with the present. Here we must make one of those inductive applications of the law of continuity which have produced such great results in all the positive sciences. We must extend the law of insistency into the future. Plainly, the insistency of a future idea with reference to the present is a quantity affected by the minus sign; for it is the present that affects the future, if there be any effect, not the future that affects the present. Accordingly, the curve of insistency is a sort of equilateral hyperbola. [See the figure.] Such a conception is none the less mathematical, that its quantification cannot now be exactly specified.

Now consider the induction which we have here been led into. This curve says that feeling which has not yet emerged into immediate consciousness is already affectible and already affected. In fact, this is habit, by virtue of which an idea is brought up into present consciousness by a bond that had already been established between it, and another idea while it was still *in futuro*.

We can now see what the affection of one idea by another consists in. It is that the affected idea is attached as a logical predicate to the affecting idea as subject. So when a feeling emerges into immediate consciousness, it always appears as a modification of a more or less general object already in the mind. The word suggestion is well adapted to expressing this relation. The future is suggested by, or rather is influenced by the suggestions of, the past.

IDEAS CANNOT BE CONNECTED EXCEPT BY CONTINUITY.

That ideas can nowise be connected without continuity is sufficiently evident to one who reflects upon the matter. But still the opinion may be entertained that after continuity has once made the connection of ideas possible, then they may get to be connected in other modes than through continuity. Certainly, I cannot see how anyone can deny that the infinite diversity of the universe, which we call chance, may bring ideas into proximity which are not associated in one general idea. It may do this many times. But then the law of continuous spreading will produce a mental association; and this I suppose is an abridged statement of the way the universe has been evolved. But if I am asked whether a blind ἀνάγκη cannot bring ideas together, first I point out that it would not remain blind. There being a continuous connection between the ideas, they would infallibly become associated in a living, feeling, and perceiving general idea. Next, I cannot see what the mustness or necessity of this ἀνάγκη would consist in. In the absolute uniformity of the phenomenon, says the nominalist. Absolute is well put in; for if it merely happened so three times in succession, or three million times in succession, in the absence of any reason, the coincidence could only be attributed to chance. But absolute uniformity must extend over the whole infinite future; and it is idle to

talk of that except as an idea. No; I think we can only hold that wherever ideas come together they tend to weld into general ideas; and wherever they are generally connected, general ideas govern the connection; and these general ideas are living feelings spread out.

MENTAL LAW FOLLOWS THE FORMS OF LOGIC.

The three main classes of logical inference are Deduction, Induction, and Hypothesis. These correspond to three chief modes of action of the human soul. In deduction the mind is under the dominion of a habit or association by virtue of which a general idea suggests in each case a corresponding reaction. But a certain sensation is seen to involve that idea. Consequently, that sensation is followed by that reaction. That is the way the hind legs of a frog, separated from the rest of the body, reason, when you pinch them. It is the lowest form of psychical manifestation.

By induction, a habit becomes established. Certain sensations, all involving one general idea, are followed each by the same reaction; and an association becomes established, whereby that general idea gets to be followed uniformly by that reaction.

Habit is that specialisation of the law of mind whereby a general idea gains the power of exciting reactions. But in order that the general idea should attain all its functionality, it is necessary, also, that it should become suggestible by sensations. That is accomplished by a psychical process having the form of hypothetic inference. By hypothetic inference, I mean, as I have explained in other writings, an induction from qualities. For example, I know that the kind of man known and classed as a "mugwump" has certain characteristics. He has a high self-respect and places great value upon social distinction. He laments the great part that rowdyism and unrefined good-fellowship play in the dealings of American politicians with their constituency. He thinks that the reform which would follow from the abandonment of the system by which the distribution of offices is made to strengthen party organisations and a return to the original and essential conception of office-filling would be found an unmixed good. He holds that monetary considerations should usually be the decisive ones in questions of public policy.

He respects the principle of individualism and of *laisser-faire* as the greatest agency of civilisation. These views, among others, I know to be obtrusive marks of a "mugwump." Now, suppose I casually meet a man in a railway-train, and falling into conversation find that he holds opinions of this sort; I am naturally led to suppose that he is a "mugwump." That is hypothetic inference. That is to say, a number of readily verifiable marks of a mugwump being selected, I find this man has these, and infer that he has all the other characters which go to make a thinker of that stripe. Or let us suppose that I meet a man of a semi-clerical appearance and a sub-pharisaical sniff, who appears to look at things from the point of view of a rather wooden dualism. He cites several texts of scripture and always with particular attention to their logical implications; and he exhibits a sternness, almost amounting to vindictiveness, toward evil-doers, in general. I readily conclude that he is a minister of a certain denomination. Now the mind acts in a way similar to this, every time we acquire a power of coördinating reactions in a peculiar way, as in performing any act requiring skill. Thus, most persons have a difficulty in moving the two hands simultaneously and in opposite directions through two parallel circles nearly in the medial plane of the body. To learn to do this, it is necessary to attend, first, to the different actions in different parts of the motion, when suddenly a general conception of the action springs up and it becomes perfectly easy. We think the motion we are trying to do involves this action, and this, and this. Then, the general idea comes which unites all those actions, and thereupon the desire to perform the motion calls up the general idea. The same mental process is many times employed whenever we are learning to speak a language or are acquiring any sort of skill.

Thus, by induction, a number of sensations followed by one reaction become united under one general idea followed by the same reaction; while by the hypothetic process, a number of reactions called for by one occasion get united in a general idea which is called out by the same occasion. By deduction, the habit fulfils its function of calling out certain reactions on certain occasions.

UNCERTAINTY OF MENTAL ACTION.

The inductive and hypothetic forms of inference are essentially probable inferences, not necessary; while deduction may be either necessary or probable.

But no mental action seems to be necessary or invariable in its character. In whatever manner the mind has reacted under a given sensation, in that manner it is the more likely to react again; were this, however, an absolute necessity, habits would become wooden and ineradicable, and no room being left for the formation of new habits, intellectual life would come to a speedy close. Thus, the uncertainty of the mental law is no mere defect of it, but is on the contrary of its essence. The truth is, the mind is not subject to "law," in the same rigid sense that matter is. It only experiences gentle forces which merely render it more likely to act in a given way than it otherwise would be. There always remains a certain amount of arbitrary spontaneity in its action, without which it would be dead.

Some psychologists think to reconcile the uncertainty of reactions with the principle of necessary causation by means of the law of fatigue. Truly for a *law*, this law of fatigue is a little lawless. I think it is merely a case of the general principle that an idea in spreading loses its insistency. Put me tarragon into my salad, when I have not tasted it for years, and I exclaim "What nectar is this!" But add it to every dish I taste for week after week, and a habit of expectation has been created; and in thus spreading into habit, the sensation makes hardly any more impression upon me; or, if it be noticed, it is on a new side from which it appears as rather a bore. The doctrine that fatigue is one of the primordial phenomena of mind I am much disposed to doubt. It seems a somewhat little thing to be allowed as an exception to the great principle of mental uniformisation. For this reason, I prefer to explain it in the manner here indicated, as a special case of that great principle. To consider it as something distinct in its nature, certainly somewhat strengthens the necessitarian position; but even if it be distinct, the hypothesis that all the variety and apparent arbitrariness of mental action ought

to be explained away in favor of absolute determinism does not seem to me to recommend itself to a sober and sound judgment, which seeks the guidance of observed facts and not that of prepossessions.

RESTATEMENT OF THE LAW.

Let me now try to gather up all these odds and ends of commentary and restate the law of mind, in a unitary way.

First, then, we find that when we regard ideas from a nominalistic, individualistic, sensualistic way, the simplest facts of mind become utterly meaningless. That one idea should resemble another or influence another, or that one state of mind should so much as be thought of in another is, from that standpoint, sheer nonsense.

Second, by this and other means we are driven to perceive, what is quite evident of itself, that instantaneous feelings flow together into a continuum of feeling, which has in a modified degree the peculiar vivacity of feeling and has gained generality. And in reference to such general ideas, or continua of feeling, the difficulties about resemblance and suggestion and reference to the external, cease to have any force.

Third, these general ideas are not mere words, nor do they consist in this, that certain concrete facts will every time happen under certain descriptions of conditions; but they are just as much, or rather far more, living realities than the feelings themselves out of which they are concreted. And to say that mental phenomena are governed by law does not mean merely that they are describable by a general formula; but that there is a living idea, a conscious continuum of feeling, which pervades them, and to which they are docile.

Fourth, this supreme law, which is the celestial and living harmony, does not so much as demand that the special ideas shall surrender their peculiar arbitrariness and caprice entirely; for that would be self-destructive. It only requires that they shall influence and be influenced by one another.

Fifth, in what measure this unification acts, seems to be regulated only by special rules; or, at least, we cannot in our present

knowledge say how far it goes. But it may be said that, judging by appearances, the amount of arbitrariness in the phenomena of human minds is neither altogether trifling nor very prominent.

PERSONALITY.

Having thus endeavored to state the law of mind, in general, I descend to the consideration of a particular phenomenon which is remarkably prominent in our own consciousnesses, that of personality. A strong light is thrown upon this subject by recent observations of double and multiple personality. The theory which at one time seemed plausible that two persons in one body corresponded to the two halves of the brain will, I take it, now be universally acknowledged to be insufficient. But that which these cases make quite manifest is that personality is some kind of coördination or connection of ideas. Not much to say, this, perhaps. Yet when we consider that, according to the principle which we are tracing out, a connection between ideas is itself a general idea, and that a general idea is a living feeling, it is plain that we have at least taken an appreciable step toward the understanding of personality. This personality, like any general idea, is not a thing to be apprehended in an instant. It has to be lived in time; nor can any finite time embrace it in all its fulness. Yet in each infinitesimal interval it is present and living, though specially colored by the immediate feelings of that moment. Personality, so far as it is apprehended in a moment, is immediate self-consciousness.

But the word coördination implies somewhat more than this; it implies a teleological harmony in ideas, and in the case of personality this teleology is more than a mere purposive pursuit of a predeterminate end; it is a developmental teleology. This is personal character. A general idea, living and conscious now, it is already determinative of acts in the future to an extent to which it is not now conscious.

This reference to the future is an essential element of personality. Were the ends of a person already explicit, there would be no room for development, for growth, for life; and consequently there would be no personality. The mere carrying out of prede-

termined purposes is mechanical. This remark has an application to the philosophy of religion. It is that a genuine evolutionary philosophy, that is, one that makes the principle of growth a primordial element of the universe, is so far from being antagonistic to the idea of a personal creator, that it is really inseparable from that idea; while a necessitarian religion is in an altogether false position and is destined to become disintegrated. But a pseudo-evolutionism which enthrones mechanical law above the principle of growth, is at once scientifically unsatisfactory, as giving no possible hint of how the universe has come about, and hostile to all hopes of personal relations to God.

COMMUNICATION.

Consistently with the doctrine laid down in the beginning of this paper, I am bound to maintain that an idea can only be affected by an idea in continuous connection with it. By anything but an idea, it cannot be affected at all. This obliges me to say, as I do say, on other grounds, that what we call matter is not completely dead, but is merely mind hide-bound with habits. It still retains the element of diversification; and in that diversification there is life. When an idea is conveyed from one mind to another, it is by forms of combination of the diverse elements of nature, say by some curious symmetry, or by some union of a tender color with a refined odor. To such forms the law of mechanical energy has no application. If they are eternal, it is in the spirit they embody; and their origin cannot be accounted for by any mechanical necessity. They are embodied ideas; and so only can they convey ideas. Precisely how primary sensations, as colors and tones, are excited, we cannot tell, in the present state of psychology. But in our ignorance, I think that we are at liberty to suppose that they arise in essentially the same manner as the other feelings, called secondary. As far as sight and hearing are in question, we know that they are only excited by vibrations of inconceivable complexity; and the chemical senses are probably not more simple. Even the least psychical of peripheral sensations, that of pressure, has in its excitation conditions which, though apparently simple, are seen to be

complicated enough when we consider the molecules and their attractions. The principle with which I set out requires me to maintain that these feelings are communicated to the nerves by continuity, so that there must be something like them in the excitants themselves. If this seems extravagant, it is to be remembered that it is the sole possible way of reaching any explanation of sensation, which otherwise must be pronounced a general fact absolutely inexplicable and ultimate. Now absolute inexplicability is a hypothesis which sound logic refuses under any circumstances to justify.

I may be asked whether my theory would be favorable or otherwise to telepathy. I have no decided answer to give to this. At first sight, it seems unfavorable. Yet there may be other modes of continuous connection between minds other than those of time and space.

The recognition by one person of another's personality takes place by means to some extent identical with the means by which he is conscious of his own personality. The idea of the second personality, which is as much as to say that second personality itself, enters within the field of direct consciousness of the first person, and is as immediately perceived as his ego, though less strongly. At the same time, the opposition between the two persons is perceived, so that the externality of the second is recognised.

The psychological phenomena of intercommunication between two minds have been unfortunately little studied. So that it is impossible to say, for certain, whether they are favorable to this theory or not. But the very extraordinary insight which some persons are able to gain of others from indications so slight that it is difficult to ascertain what they are, is certainly rendered more comprehensible by the view here taken.

A difficulty which confronts the synechistic philosophy is this. In considering personality, that philosophy is forced to accept the doctrine of a personal God; but in considering communication, it cannot but admit that if there is a personal God, we must have a direct perception of that person and indeed be in personal communication with him. Now, if that be the case, the question arises how it is possible that the existence of this being should ever have been

doubted by anybody. The only answer that I can at present make is that facts that stand before our face and eyes and stare us in the face are far from being, in all cases, the ones most easily discerned. That has been remarked from time immemorial.

CONCLUSION.

I have thus developed as well as I could in a little space the *synechistic* philosophy, as applied to mind. I think that I have succeeded in making it clear that this doctrine gives room for explanations of many facts which without it are absolutely and hopelessly inexplicable; and further that it carries along with it the following doctrines: 1st, a logical realism of the most pronounced type; 2nd, objective idealism; 3rd, tychism, with its consequent thoroughgoing evolutionism. We also notice that the doctrine presents no hindrances to spiritual influences, such as some philosophies are felt to do.

C. S. PEIRCE.

MR. CHARLES S. PEIRCE'S ONSLAUGHT ON THE DOCTRIN E OF NECESSITY.

THE problem of necessity lurks at the bottom of all problems, and according as we accept or reject the idea of necessity we shall be led to two entirely different world-conceptions.

The conception of indeterminism generally offers itself first to the doubting mind; and it is apparently a pleasant idea. It promises freedom, it leaves room for the imagination, it makes the world and its possibilities wide, much wider than it could be on the plan of determinism. Determinism is at first sight an oppressive notion and we naturally shrink from it. It seems to destroy the freedom of the will and all moral responsibility. From infinite possibilities it narrows the world down to one single actuality; and thus it seems to destroy all the charms of life.

The former view may be represented as conceiving the all-power of the whole in which and through which we live as a well meaning and yielding ruler or a kind-hearted parent who if strongly plied with prayer, will for a trifle in order to please an importune favorite change his decisions. The dispensations of his government will be full of exceptions, of private cabinet decrees, of counter orders and irregularities. The latter view, however, would represent the entirety of the All as an inexorable and uncompromising sovereign, or as a severe educator, a stern father who unfalteringly clings to his principles. He leaves full independence to his children, he does not prevent their mistakes, yet rigidly lets them bear the consequences of their actions. He never answers prayers except that the prayer itself has its educating effects upon him who prays; but he

never alters objective facts for the sake of him who requests his interference, and he never makes exceptions either in favor or disfavor of anybody. In brief; the God of him who accepts the former view, will be Chance, while the God of him who accepts the latter view will be Law.

The choice between the two views seems to remind us of the choice left to the heroes of our fairy tales. He who chooses that which appears pleasant will be led into inextricable confusion, he who chooses that which appears rigid and oppressive will be led on a path where in spite of many difficulties he will be able to make firm and certain steps and will arrive at clearness as well as moral freedom. It is not the golden casket that contains Portia's picture.

Science constantly operates on the basis of the maxim that there is no chance, that everything that happens, happens as it does with necessity. The question is, Is this maxim a mere assumption, a non-verifiable working hypothesis; or is there any reliable evidence in its favor? Is it true, and if it is, how can it be proved?

I.

DAVID HUME REDIVIVUS.

Mr. Charles S. Peirce's article entitled "The Doctrine of Necessity Examined," which appeared in the last number of *The Monist*, must have been a surprise to many thinking readers. It must have affected them in a somewhat similar manner as Hume's "Treatise of Human Nature" affected Kant. It roused him from his dogmatic slumber: He abandoned dogmatism but nevertheless did not accept Hume's skepticism; he remained positive; yet he propounded a better positive view than was the old dogmatism; he established in philosophy the method of critique.

The parallelism between David Hume, who doubted the validity of our conception of causation, and Mr. Charles S. Peirce who denies the universality of the doctrine of necessity, is very marked in more than one respect. It is, in spite of many differences, a case of close analogy, and the answer which we shall have to give to either, will in many respects be suited to both. Both shake the

ultimate ground of scientific research at its very root. Both call in question the most fundamental concept upon which all our methods of investigation and philosophy rest. Both challenge the reliability of an idea of which few would hesitate to say that it is all but universally accepted. In fact the ideas "causation" and "necessity" are more than kin. If analysed, many of their elements will be found to be actually identical. Thus the one cannot be either established or doubted without establishing or doubting the other. Accordingly Mr. Peirce, in some respect, repeats David Hume's onslaught upon the current conception of the basis of human knowledge with the more formidable weapons which a century of close thought and scientific investigation have furnished him.

If Kant's answer to Hume had been satisfactory, Mr. Peirce probably would not have renewed the attack or he would have had to modify it considerably. Kant, however, whom we both, Mr. Peirce as much as I myself, admire as a master of philosophic thought, did not solve the question satisfactorily. Yet Kant pointed out the way of solving it, which was the middle way between dogmatism and scepticism, called by him and his followers "Criticism," and it is this way on which we trust is safest travelling.

Mr. Peirce is right that the doctrine of necessity cannot be "postulated," for "to postulate a proposition is no more than to hope it will be true." The doctrine of necessity is, indeed, usually treated as a postulate, and Mr. Peirce's attack appears formidable because he shows the weakness of the arguments which are commonly brought forward in its favor and which we grant to be insufficient.

Mr. Peirce says (*The Monist*, II, 3, p. 330):

> "In view of all these considerations, I do not believe that anybody, not in a state of casehardened ignorance respecting the logic of science, can maintain that the precise and universal conformity of facts to law is clearly proved, or even rendered particularly probable, by any observations hitherto made. In this way, the determined advocate of exact regularity will soon find himself driven to *a priori* reasons to support his thesis. These received such a sockdologer from Stuart Mill in his Examination of Hamilton, that holding to them now seems to me to denote a high degree of imperviousness to reason; so that I shall pass them by with little notice."

Mr. Peirce is right when saying that necessitarianism must be founded on something other than observation. Observation is *a posteriori;* it has reference only to single facts, to particulars; yet the doctrine of necessity, if there is anything in it at all, is of universal application. The doctrine of necessity, let us not be afraid to pronounce it clearly, is of an *a priori* nature. The scientist assumes *a priori*, i. e. even before he makes his observations or experiments, as a general law applicable to every process which takes place, that, whatever happens, happens of necessity in consequence of a cause and in conformity to law, so that the same cause under the same circumstances will produce the same effects. If all the *a priori* reasons, as Mr. Peirce maintains, received a sockdologer from Stuart Mill, then indeed we shall have to abandon the idea of necessity as the superstition of a past and erroneous philosophy and we shall have to start the world of science over again.

Mr. Peirce denies the strict regularity of natural law and introduces an element of chance. He says (ibid. p. 336):

"To undertake to account for anything by saying boldly that it is due to chance would, indeed, be futile. But this I do not do. *I make use of chance chiefly to make room for a principle of generalisation, or tendency to form habits, which I hold has produced all regularities.** The mechanical philosopher leaves the whole specification of the world utterly unaccounted for, which is pretty nearly as bad as to boldly attribute it to chance. I attribute it altogether to chance, it is true, but to chance in the form of a spontaneity which is to some degree regular."

Mr. Peirce is the pathfinder of a new and as yet untried road. He strikes out boldly into the tumultuous ocean of chance, hoping to find in his journey the connection between the East and the West, between contrasts that seem to him otherwise unconnectible. The confidence of the bold discoverer is set forth in the warnings he gives to all seafaring people. He attempts to frighten the ill-informed minds who might innocently venture out in other directions; and he will thus naturally prevent many from falling either into the Charybdis of doubting the propriety of applying the logic of probabilities to the problem of necessity and causation in general, or, worse still,

* Italics are ours.

into the Scylla of the *a priori*. The former, he tells us denotes "a state of case-hardened ignorance respecting the logic of science," the latter "a high degree of imperviousness to reason."

Mr. Peirce is well known as one of the keenest logicians now living. Considering this fact I am slow to take up arms against him in defending a case which he so strongly brands beforehand. I must from the beginning plead guilty to a belief in necessity, and having critically revised my view once more I cannot help upholding it. I am fully conscious of the fact that hundreds, thousands, and millions of single experiences (which in Kantian terminology are called *a posteriori* arguments) cannot establish a solid belief in necessity, nor can any imaginable number of sequences prove the rigidity of causation, and I confess freely that I support my thesis with *a priori* reasons. Yet at the same time attention must be called to the fact that neither Mr. Hamilton nor Mr. Mill had any adequate conception of the *a priori*, and Mr. Mill's sockdologer does not disturb in the least the assurance of my view; for the *a priori* can, in my opinion, be based upon the firm ground of experience.

All the many sense-experiences at our command, if considered singly, cannot constitute knowledge. In order to weave the woof of the *a posteriori* into coherent cloth we want the warp of the *a priori*, and I do not see how we can do without it. But the *a priori* is not that mystical hocus-pocus of absolute truth with its impertinent assumptions such as it is presented by pseudo-Kantians and justly denounced by Mill; it is not as Mr. Peirce brands it an "I cannot help believing," it is not a "natural belief," nor is it as others conceive it an innate idea. It is, briefly described, simply and solely formal knowledge, such as $2 \times 2 = 4$, to which we attribute universality and necessity and with the assistance of which we are enabled to predict and predetermine certain results beforehand (i. e. *a priori*). We might invent a new name for the *a priori*, the latter having become odious through the denunciations of its enemies and worse still, having been distorted beyond recognition through the misuse to which it was put by its defenders and suppositional friends. Yet that would be another question, and the idea of the *a priori*, i. e. of formal knowledge involving universality and necessity would remain the same.

The universality and necessity of formal knowledge are as a rule taken for granted by scientists. But philosophy can take nothing for granted, and the problem rises: How is the belief in the universality and necessity of formal knowledge to be justified? Mr. Peirce's onslaught on the doctrine of necessity is a challenge to answer this question.

II.

CAUSATION NOT MERE SEQUENCE.

Mr. John Venn published some twenty-five or six years ago an excellent treatise called "The Logic of Chance." This work opened the eyes of many to the great importance of the calculus of probabilities as a method of science which was of much wider application than had before been suspected. This admirable work we may boldly say marks a new epoch in the study of logic, it opened new vistas, and many expectations created by it have since been realised. Yet it is to be regretted that the author adopts Hume's erroneous conception of causality and thus implicitly paves the way which Mr. Peirce has actually followed and which leads to a denial of the doctrine of necessity. Concerning "the doctrine of universal causation" Mr. Venn says, in Chapter XIV:

"We will employ the word simply in the sense which is becoming almost universally adopted by scientific men, viz. that of invariable unconditional sequence.

"It is in this sense that the word *cause* is used by Mr. Mill. . . .

"This meaning of the term is rapidly becoming the popular, or rather, the popular scientific one."

This idea of "sequence" however was exactly Hume's mistake, adopted by Mr. Mill and through Mr. Mill popularised among English thinkers. If the nature of cause and effect were really constituted by invariable sequence, then the night might be called the effect of the day because night is invariably consequent upon day.

Hume, taking the ground that cause and effect constitute a sequence, attempted a synthesis of both; he searched for a proof of their identity and failed. And it was natural that he failed, for cause and effect are so radically different that we cannot bring them into the formula of an equation as "cause = effect." There is no cause that is equal to its effect.

Hume should have considered causation as one single process, and instead of attempting a synthesis, he should have made an analysis. The analysis would have shown that cause and effect are two abstract and correlative terms of one whole and inseparable event. Cause is not identical with effect, but the whole event is identical with itself.

If my finger touches a key of the piano, a chord is struck; the chord swings and produces certain air-vibrations. In this process from the beginning to the end all the energy employed and the mass of the material particles remain in amount the same, yet there is a change of form taking place. Causation is not mere sequence, but a sequence of quite a special kind. It is a sequence of two states which belong together as an initial and a final aspect of one and the same event.

So long as we know of two events simply that they follow one another, although the sequence may in every case be invariable and unexceptional, we are not justified in calling them cause and effect. No amount of experience is sufficient to constitute causation by a mere synthesis of sequences, and to have appreciated this truth is the immortal merit of the great Scotchman who boldly took the consequence of the argument and acquiesced in scepticism.

The problem, however, is not so desperate as Hume thought. If Hume could have considered his argument in the light which the law of the conservation of matter and energy sheds upon it, he would most likely have abandoned his scepticism; for causality is perfectly intelligible if conceived not as a synthesis of two radically different events, but as a process of transformation, of which the prior state is called cause and the final one effect.

That two radically different events, which are not thought of as transformation, invariably follow each other without our being able to discover any connection between them, will naturally appear as a mystery; but that two forms are radically different things, although they may be forms of the same amount of matter and energy, is no mystery. The effect is, or may be, something entirely new. The configuration of things as it appears in the effect, did not exist

before. But for that reason, it is no creation out of nothing, it is not an incomprehensible event, it is no miracle.

It is a very wonderful thing that two congruent regular tetrahedrons, when put together, will form a hexahedron, but the laws of form do perfectly and satisfactorily explain it. Supposing we had no idea of the laws of form or only an incoherent and fragmentary knowledge of them, should we not look upon the result of this combination as a strange and incomprehensible mystery. Two heaps of flour one poured upon the other will give one heap of the same kind and shape but of a larger size. However, the combination of the two four-sided bodies does not produce another four-sided body doubly as large as any of the two four-sided bodies. Nor does it produce an eight-sided body. It produces a six-sided body, which is something quite new. The result is not contained in the conditions singly, for no one can say that six-sidedness is a quality implicitly contained in four-sided bodies.

The process of combining hydrogen with oxygen into water (H_2 O) is an immensely more complex case, and the qualities resulting from a difference of density as well as configuration are entirely unknown to us. There is nevertheless no reason whatever to consider the process as different in principle; it is a case of transformation in which the amount of matter and energy remains the same.

Whatever the value of the logic of chance may be for scientific reasoning in establishing gradations of certainty and formulating the reliability of a certain belief, we deny most positively its applicability to the principle of causation in general. If we ask what the chance is of a combination of two congruent tetrahedrons becoming a hexahedron, we must answer that the probability is exactly 1, which means certainty, and certainty is but another name for necessity.

Mr. Peirce does not object to necessity in certain cases, he objects to necessity being a universal feature of the world. He objects to the rigidity of causation in so far only as to allow a trifle of chance to enter into nature.

One or two cases or even a hundred, and a thousand, nay millions of millions of cases in which causation is explicable as transfor-

mation is no proof that this must always be so. Mr. Peirce may grant and most likely he does grant that causation in a definite set of experiences is transformation, yet what guarantee do we have for saying that it is the only kind of causation. Might there not be room in this world for another causation which for lack of a full comprehension of its nature, we may call the causation of chance?

We answer that form is a quality of this world, not of some samples of it, but throughout, so far as we know of existence even in the most superficial way, and thus we know beforehand or *a priori* that the laws of form hold good so far as our telescopes sweep through space. We are ignorant as to the qualities dependent upon special forms of matter or energy, and we can acquire any knowledge thereof only through experience; but that is no reason to doubt the validity of causation in general, or to surmise the probability of there being somewhere a different arrangement of nature.

Thus we come to the conclusion that the calculus of probabilities is not applicable to the order of the world as to whether it may or may not be universal. And in corroboration of this our position we quote the following passage from a high authority in the science of logic, who is no less than Mr. Charles S. Peirce himself. "Illustrations of the Logic of Science," (*Popular Science Monthly*, 1877, p. 714):

"The relative probability of this or that arrangement of Nature is something which we should have a right to talk about if universes were as plenty as blackberries, if we could put a quantity of them in a bag, shake them well up, draw out a sample, and examine them to see what proportion of them had one arrangement and what proportion another. But, even in that case, a higher universe would contain us, in regard to whose arrangements the conception of probability could have no applicability."

Mr. Peirce is still more emphatic in another passage which reads (ib. 1878, p. 205):

"If any one has ever maintained that the universe is a pure throw of the dice, the theologians have abundantly refuted him. 'How often,' says Archbishop Tillotson, 'might a man, after he had jumbled a set of letters in a bag, fling them out upon the ground before they would fall into an exact poem, yea, or so much as make a good discourse in prose! And may not a little book be as easily made by chance as this great volume of the world?' The chance world here shown to be so

different from that in which we live would be one in which there were no laws, the characters of different things being entirely independent; so that, should a sample of any kind of objects ever show a prevalent character, it could only be by accident, and no general proposition could ever be established. Whatever further conclusions we may come to in regard to the order of the universe, thus much may be regarded as solidly established, that the world is not a mere chance-medley."

Here follows a close reasoning of several pages which ends (on p. 207) with a paragraph beginning with the words:

"This shows that a contradiction is involved in the very idea of a chance world."

And a long paragraph on p. 208 winds up with these sentences:

"The actual world is almost a chance-medley to the mind of a polyp. The interest which the uniformities of Nature have for an animal measures his place in the scale of intelligence."

This is exactly the position which I defend. If universes were as plenty as blackberries we might talk about the order of other universes. They might be four- or five- or *n*-dimensional. Yet even in all these cases they would not be void of form. The four-dimensional universe would have another arrangement, but its laws would be none the less orderly, none the less regular, and a higher universe would contain them all. Supposing there were four- or five-dimensional space somewhere, we could state with absolute precision all the formal laws by which bodies of so many dimensions were governed.*

The order of form and the rigidity of formal laws is as universal and omnipresent as God. They encompass our path and our lying down, they have beset our behind and before. If we ascend up into heaven they are there, if we make our beds in hell, behold they are there. If we take the wings of the morning and dwell in the uttermost parts of the sea, even there they shall lead us and hold us.

III.

MR. PEIRCE'S LOGIC OF SCIENCE.

In spite of the fundamental difference that obtains between Mr. Peirce's and our own world-conception, we must state that there are

* See *Fundamental Problems*, p. 55.

many most important points of agreement. Mr. Peirce says in his article "Illustrations of the Logic of Science," (ibid. p. 3 and 7):

"The object of reasoning is to find out, from the consideration of what we already know, something else which we do not know. * * *

"The settlement of opinion is the sole object of inquiry."

There are according to Peirce several methods of settling opinion, which swayed humanity in an historic succession: (1) The method of tenacity. Doubt being an uneasy and dissatisfied state, we cling tenaciously not merely to believing, but to believing just what we do believe. (2) The method of authority, which is that of the Roman Church and of all great political and religious institutions of the past. (3) The *a priori* method, by which Mr. Peirce understands the fixing of belief agreeably to reason, i. e. to the subjective conviction of the individual thinker. All these methods have their merits, says Mr. Peirce (ibid. p. 13):

"The *a priori* method is distinguished for its comfortable conclusions. It is the nature of the process to adopt whatever belief we are inclined to, and there are certain flatteries to the vanity of man which we all believe by nature, until we are awakened from our pleasing dream by some rough facts. The method of authority will always govern the mass of mankind. . . . But most of all I admire the method of tenacity for its strength, simplicity, and directness."

It is apparent that the merit of the *a priori* method so called is really a vice. The *a priori* method so called is the basis of agnosticism. If according to my reason this, and according to your reason that, may be the truth, where does truth remain? If truth is purely subjective, truth becomes impossible. The method of settling belief agreeably to our individual tempers is the death of objective truth, of science and philosophy.

Mr. Peirce fully recognises the practical importance of thought. He says:

"The production of belief is the sole function of thought" (ibid. p. 289).

"Our beliefs guide our desires and shape our actions" (ibid. p. 5).

"What is belief? First, it is something that we are aware of; second, it appeases the irritation of doubt; and third, it involves the establishment in our nature of a rule of action, or, say for short, a *habit*" (ibid. p. 291).

"Thus, we come down to what is tangible and practical, as the root of every real distinction of thought, no matter how subtile it may be; and there is no dis-

tinction of meaning so fine as to consist in anything but a possible difference of practice" (ibid. p. 293).

Mr. Peirce is very far from considering philosophy as a mere matter of speculation or theory without practical importance. He says:

"What sort of a conception we ought to have of the universe, how to think of the *ensemble* of things, is a fundamental problem in the theory of reasoning."

The *a priori* method, so called by Mr. Peirce, translated into practical life is not only the death of truth but also of morality. The objective criterion of truth is gone, and with it goes the objective standard of right and wrong. If that is true which seems so to my individual reason, then that is right which pleases me best. What is right to me might be wrong to you. Thus this method leads either to moral indifference, or to basing ethics upon the greatest amount of pleasure attainable, (Hedonism, as represented by Mr. H. Spencer, Prof. Harald Höffding, Professor Gizycki, and others,) or to relying upon the individual conscience as an absolute and ultimate authority.*

The method of settling opinion agreeably to individual reason is at present the most fashionable and widely spread conception, and it shows its influence in the almost universal acceptation of agnosticism to-day. Is that the final decision with which we have to rest satisfied? If it were, we would better return to the method of authority or tenacity. No, it is not the sum of all wisdom. The *a priori* method so called represents a period of transition, which, if persistently pursued, will lead to the bankruptcy of thought, the desperate appearance of which is well disguised in the big sounding and modesty-parading term agnosticism. And here we return to the exposition of Mr. Peirce's views. Mr. Peirce does not accept the *a priori* method, he believes in "the logic of science." Mr. Peirce says:

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*This is the position of the Societies for Ethical Culture which are not confessedly but practically agnostics. Professor Adler's position is characterised in *The Monist*, Vol I, No. 4, p. 567, 599, and *The Open Court* Nos. 225 and 234. Mr. Salter bases ethics upon "the immovable rock of conscience." (See his *Ethical Religion*, p. 295.)

"To satisfy our doubts, therefore, it is necessary that a method should be found by which our beliefs may be caused by nothing human, but by some external permanency—by something upon which our thinking has no effect. . . . The method must be such that the ultimate conclusion of every man shall be the same. Such is the method of science" (ibid. p. 11.)

"That whose characters are independent of how you or I think is an external reality" (ibid. p. 298).

"All the followers of science are fully persuaded that the processes of investigation, if only pushed far enough, will give one certain solution to every question to which they can be applied. . . . They may at first obtain different results, but, as each perfects his method and his processes, the results will move steadily together toward a destined centre. . . . The opinion which is fated to be ultimately agreed to by all who investigate, is what we mean by the truth, and the object represented in this opinion is the real" (ibid. pp. 299–300).

The word "fated" must be understood as Mr. Peirce understands it. He adds in a footnote:

"Fate means merely that which is sure to come true, and cannot be avoided.'

IV.

NECESSITY IN THOUGHT PRESUPPOSES NECESSITY IN FACTS.

I have thus outlined Mr. Peirce's views, not only because his line of reasoning* is admirable and deserves to be universally known and recognised, but also because it seems to me to have some bearing upon the question at issue.

If the ultimate conclusion of every man concerning reality shall be the same, there must be some truth in the idea of necessity. If there is an opinion "fated to be ultimately agreed to," we are confronted in our representation of reality with something that is inevitable. Shall there be necessity in thought but not in that of which all our ideas are but images and symbols? We can conceive of the necessity in the ideal realm of thought only as a reflection of that necessity which pervades the original and prototype of our thought, which lives in reality.

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*Ernst Schroeder in his great work *Vorlesungen über die Algebra der Logik* adopts in the main the results of Peirce. A sketch of Mr. Peirce's line of thought, (his *Gedankengang*, as Schroeder calls it,) is found in the *Einleitung*, pp. 107–118.

V.

MR. PEIRCE'S EVOLUTIONISM.

I have tried to find an explanation of Mr. Peirce's position which appears to me self-contradictory and I believe I have found the key that will explain it.

I read somewhere a stray remark of Mr. Peirce's in which he demanded that evolutionism should be thorough-going. The conception of evolution in vogue at present, he said, stops short at a certain point, and substitutes for an explanation the unknowable. Mr. Peirce says:

"Does not space call for some explanation? Is not that a half-way philosophy which in these our days does not explain, or at least hold out some promise of explaining, why space is continuous, why it has such a wonderful uniformity in all its parts, why there are neither more nor less than three dimensions everywhere, why every closed curve can, by a continuous change of position, size, and form, be brought into coincidence with every other, and why the three angles of a triangle make exactly one hundred and eighty degrees, or at least so very closely so that we cannot tell whether they make more or less?"

Mr. Peirce does not intend to halt before these problems, but to explain them and carries the principle of evolution to its ultimate conclusions, so as to explain from it not only the forms of living organisms but also the laws of nature including the laws of space. Mr. Peirce declares in his article "The Architecture of Theories" (*The Monist*, Vol. I, No. 2, p. 165):

"Uniformities are precisely the sort of facts that need to be accounted for. . . . Law is *par excellence* the thing that wants a reason."

And what he means by it is further elucidated in his article "The Doctrine of Necessity Examined" (*The Monist*, Vol. II, No. 3, p. 334):

"That single events should be hard and unintelligible, logic will permit without difficulty: we do not expect to make the shock of a personally experienced earthquake appear natural and reasonable by any amount of cogitation. But logic does expect things *general* to be understandable. To say that there is a universal law, and that it is a hard, ultimate, unintelligible fact, the why and wherefore of which can never be inquired into, at this a sound logic will revolt; and will pass over at once to a method of philosophising which does not thus barricade the road of discovery."

It is perfectly true that "law is *par excellence* the thing that wants a reason," and any explanation that explains it by the assumption of an unknowable is unphilosophical. I agree with Mr. Peirce that we must not halt here; but I have no confidence in his method of explanation. Mr. Peirce's original idea, then, and I should add, his main mistake, is that he proposes to explain the origin of natural law by evolution.

In his legitimate anxiety to explain law, Mr. Peirce declares chance to be exempt therefrom. He says:

"That a pitched coin should sometimes turn up heads and sometimes tails calls for no particular explanation." (*The Monist*, Vol. I, No. 2, p. 165.)

But chance in our opinion needs exactly as much explanation as anything else. Mr. Peirce very improperly identifies "that which cannot be accounted for" with "that which need not be accounted for." Absolute chance, if it existed, would *not* so much *not* call for a particular explanation as actually be unexplainable, and being incapable of explanation, it would have to be considered as an unintelligible fact, as inscrutable, incomprehensible, and mystical. On the assumption that chance need not be accounted for, Mr. Peirce builds the architecture of his theory. He says:

"Chance is first, law is second, the tendency of habits is third."

The application of this general statement is set forth in the following passage:

"In psychology Feeling is First, Sense of reaction Second, General conception Third, or mediation. In biology, the idea of arbitrary sporting is first, heredity is second, the process whereby the accidental characters become fixed is third."

How little after all we can escape the determinism of law as being a feature of the world will be seen from the fact, that the explanation for the evolution of law is presented by Mr. Peirce as being itself a law, i. e. a formula describing a regularity supposed to obtain in facts. Does not Mr. Peirce's formula, supposing it to be true, deserve the same reproach which he casts upon natural law in general, viz., that it is "a hard, ultimate, unintelligible fact, the why and wherefore of which can never be inquired into"?

VI.

WORLD-CONSTRUCTIONS.

There are two methods of philosophising, one starts with ideas which are supposed not to need any explanation, the other starts from facts and uses facts as data. The former is the method of the constructionist or ontologist, the latter that of the positivist. The constructionist attempts to beget a world-theory in the same way that God was supposed to have created the world; he attempts to bring it into being either out of a real nothing or out of something like nothing. He constructs a world-theory out of the self-evident, out of the absolute, out of the indubitable, or out of that the contrary of which is inconceivable. The positivist, however, employs facts as the given material, which he works out into a consistent and systematic whole. The former view is synthetic and constructive, the latter is analytic and descriptive. The former view is the method of Hegel, Oken, and also of Mr. Spencer, the latter is the method of all scientists and the ideal of the positive philosophy.

Mr. Peirce although very positivistic in his logic of science, must in philosophy still be counted among the constructionists.

Chance is to Mr. Peirce as much absolute as was to Hegel the idea of "abstract being," which as such, Hegel said, is equivalent to "non-being." Non-being need not be accounted for. So Hegel starts with this idea, and finding that "becoming" is the oscillation between being and non-being launches his abstract thought upon the terra firma of reality.

In the same way and with similar ingenious ingenuity Oken starts the world with zero. Zero or non-being need not be accounted for. Its existence calls for no particular reasons. What is zero? We can conceive it as "$0 = 1 - 1$." Thus we have "$+ 1$" and "$- 1$," two units. The whole world, according to Oken, is only a disintegration of Nothing, an equation of enormous complexity but always equal to zero. And that explains the world!

Mr. Spencer adopts "the principle of setting out with propositions of which the negations are unconceivable," without being aware that any inveterate belief or prejudice can be defended from

that standpoint. The principle is purely subjective. It does not admit of any objective verification and limits knowledge to individual conception. If Mr. Spencer's principle were admissible, we could not refute the adversaries of the Copernican system, when they declare that the rotation of the earth up on which we stand is inconceivable. The maxim that that proposition is most certain the negation of which is inconceivable might after all, and it actually did very often, come into conflict with facts. Many propositions are now confidently accepted which were formerly declared to be positively inconceivable.

Mr. Peirce, I say, starts the world with an abstract idea of a something of which he assumes we need not give any account, as did the great ontologists of former times. He constructs, agreeably to his reason, a theory of the way in which the world might have originated, and thus he falls into the mistake criticised by himself as the *a priori* method. Yet the weakest point of Mr. Peirce's system is that his "absolute chance" begets order; irregularity becomes law by practice, as if by a sufficiently prolonged shaking the dice would by and by acquire the habit of turning up the same faces each time.

The present world-conception of the scientist regards natural laws as eternal. The order that prevails in these laws constitutes the principle of evolution and changes the chaos of a nebula into a well-arranged planetary system. Thus the original chaos is properly speaking no chaos. It is in all its parts regulated by law and only appears chaotic in comparison with more advanced stages of evolution.

Desirous to account for the regularities of nature Mr. Peirce proposes the idea that nature in the beginning was a real, true chaos, without order, without laws, the single actions of reality taking place irregularly and in a sportive manner. Absolute chance prevailed. Everything was undetermined, exactly as much so as a man is undetermined in his action before his belief is settled. Yet a man, by and by, forms a belief and acts accordingly, not once or twice, but often, until a habit is formed. Thus Mr. Peirce assumes, Nature's actions are first undetermined, they may be of this kind or of another kind. The same particle of reality may under the same con-

ditions act in different ways, yet it acts somehow; it acts again, and repeats a certain kind of action more frequently than others, thus forming habits. Laws according to Mr. Peirce are the habits acquired by nature.

The proposition of Mr. Peirce's logic of science points out another method of constructing a world-conception. The recognition of reality in the sense as he conceives it, admonishes us that our world-conception should be a picturing, a mirroring, an imitation of the objective world of facts. It should not be the architecture of a theory, but first an analysis and then a reconstruction of experience; it should be a description of facts, methodically arranged.

VII.

FACTS AND LAWS.

That which we call natural law is not the description of a certain special and concrete form of existence which is now or then and here or there, but of some general quality of facts which is everywhere and always. The former, i. e. every special and concrete form of existence, can be explained by evolution, the latter, i. e. natural law, cannot. The former has to be accounted for by the law of causation, the latter by the principle of sufficient reason. And it is this distinction between cause and reason which Mr. Peirce does not seem to have regarded.

Every special form of existence must, at least theoretically, be traceable as the effect of some cause and every law of nature must be explainable by showing its connection with other natural laws. The only thing in the world of which we cannot and need not give account is the existence of facts itself, or being in general, which is the stubborn presence of reality in us ourselves and also outside of us, objected to our own being as an independent power to which we have to adapt our conduct. We need not prove its existence, for it exists. If anything is ultimate, facts are ultimate; and cognition is nothing but the reconstruction of facts for the purpose of orientation among them, it is a methodical description of reality in the symbols of the feelings that exist in sentient beings.

A scientist having observed a special process of nature, describes it, if possible, in such a way that it is recognised as a trans-

formation. A description of this kind is called an explanation. It renders the process intelligible to us; it is complete and exhaustive. In order to make such a description available for comprehending other cases of the same or similar kind, we have to introduce another principle, which is that of economy. We must single out those features which are common to a certain class and remove all diversity and specificalness. All specificalness and diversity are transient features due to special conditions; they disappear with these special conditions. Thus the notion of natural law involves as an essential characteristic and fundamental quality the absence of the incidental and the temporal.

Natural laws describe the facts of nature *sub specie aeternitatis.* They cease to be natural laws in the proper sense of the word as soon as they are conceived, like legal laws, as products of evolutions, which have appeared in time and may disappear again. Eternity is the characteristic feature of a natural law, it is its backbone, the essence of its being, its *conditio sine qua non.*

Thus in considering a natural phenomenon we are led to distinguish between its cause and its reason: Its cause is something special, it is an individual event, happening in time, and accordingly being transient; it is an occurrence of some kind, it is a single and definite fact. However its reason is not anything special, it is something general; it is not a single and definite fact, but it is a law of universal application; it is not transient, but a conception of things in which the incidental and temporal are eliminated. A reason is applicable to all cases of the same kind and also to all cases of any time. A cause, i. e. a fact, if it truly exists, is real (not true); a law, i. e. a reason, if it really obtains in nature, is true (not real), and any attempt at explaining natural laws as a product of evolution, being based upon the view that regards them as causes not as reasons, as real not as true, as a description of temporal existences, not as viewing facts *sub specie aeternitatis*, must from the outset be a failure.*

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* I laid down my views on the subject in a short monograph of only 82 pages, entitled *Ursache, Grund und Zweck, eine philosophische Abhandlung zur Klärung der Begriffe* (Dresden: R. von Grumbkow, Hof. Verlag, 1883). In all main points

Mr. Peirce attempts to explain natural laws as if they were single and concrete facts. Where we have to look for reasons he evidently employs the method of searching for causes. He treats that which in its very nature is eternal, as if it were temporal. He regards the everlasting, the imperishable, the immutable as if it had originated, as if it were transient, as if it were the product of a development.

VIII.

LAWS NOT INEXPLICABLE.

But is not Mr. Peirce justified in declaring that law remains unexplained? Is law really as he says "hard, ultimate, inexplicable, immutable"? Law is to be regarded as immutable but not as ultimate or inexplicable, and thus Mr. Peirce's denunciation of natural law is not

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I maintain the same standpoint still. See also *Fundamental Problems*, the chapter on Causality, pp. 79–91 and 96–109.

Since the publication of my German pamphlet my confidence that we can, (not only in the special sciences such as chemistry, mineralogy, botany, etc., but also in philosophy) arrive at truth, has rather been confirmed than shaken. We can create a common ground on which all philosophers agree, as much as mathematicians agree concerning the Pythagorean theorem. But in order to achieve this ideal, philosophers must abandon all attempts at originality. The hankering after originality is an inherited evil in the family of philosophers. The first philosophers were poets, priests, and prophets; later on in the natural evolution of human culture, a differentiation of their combined functions took place. Originality is a virtue in the poet but a vice in his brother, the philosopher. The philosopher's ideal must be to free himself of all individualism, subjectivity, and original conceptions; he must become strictly objective. He must renounce his personal likes and dislikes, and make his soul a mirror of nature, faithfully and correctly to represent the facts and nothing but the facts. This is the ethics of philosophical inquiry, and the philosophy that takes its stand on this principle we call positivism.

Almost all divergencies of importance in the different philosophical systems can be traced to different conceptions or rather misconceptions of causation.

This last century since Kant has been the most fertile age of original world-theories, all different in style and manner of construction, but all alike in so far as the author of each system had strained his utmost efforts to be original. Thus all these world-theories were so many beautiful poems on ontology, they were so many grand air-castles produced by the magic wand of a fairy-tale causation. The philosopher's aspiration must not be to present original ideas but to reach that one solution which any other unbiassed thinker must find, to express that truth which in the end will have to be recognised universally, to formulate facts in objective exactness. The degree of originality in philosophic thought marks the degree of aberration from the common aim of the one sole solution, and the greatest source of original ideas is the confusion of cause and reason, of *Ursache* and *Grund*, of event and law, of fact and truth.

justified. All natural laws must be conceived as forming one system ascending from the lower to the higher, from the more special to the more general. And the more comprehensive law represents in each case the reason for the less comprehensive law which is comprised in it. Thus we must finally reach the most general or all-comprehensive law, which is a description of that which is a universal quality of existence.

There is a wrong notion prevalent among many thinkers that the most comprehensive description (law or reason) of a certain kind should, as in a nutshell, contain and immediately explain all that which it embraces, so that if once in its possession, we should be omniscient as to all the rest. The most universal law is looked upon as the centre of existence—*das Innerste der Welt.* If we could but get there, we should solve all the world-problems by mere intuition. This is the old error of the students of magic, whose hope is expressed by Faust when he says:

> "*Dass ich erkenne, was die Welt*
> *Im Innersten zusammenhält.*"
>
> That I may detect the inmost force
> Which binds the world and shapes its course.—*Bayard Taylor.*

Comprehension is not attained simply by finding out and stating the most general feature of a certain class of facts; comprehension does not alone consist of generalisation but also of discrimination. The differences among less general laws must be recognised as results of special conditions. And any knowledge of a general law reveals nothing about the special conditions under the influence of which the same law will work differently.

It is but too often overlooked that the more general a statement is, the less it will contain, the vaguer it will appear, the emptier it must be. There is no royal road to cognition and mere generalisation is of no avail. We shall have to investigate the details of every case and view it in its relation to the general law. The general law must be viewed under those conditions which will invariably produce the same special modifications.

But do not the most general reasons remain uncomprehended?

Do we not at last arrive at an ultimate law which, then, must be hard and inexplicable?

Those laws which appear in every respect to be universal are the formal laws of mathematics, arithmetic, and their kindred sciences. And all these formal sciences are not only *not* mystical, unintelligible, and inexplicable, but they are the most perspicuous, most reliable, and most certain knowledge we possess. All their theorems admit of the most rigid demonstration, and the last shadow of mysticism has been removed by Hermann Grassmann. Owing to his searching investigations we are no longer in need of axioms which were formerly supposed to be the indispensable basis of mathematics.

There is however a basis of formal thought left which we cannot dispense with; that is the idea of sameness, generally formulated as the law of identity. Is perhaps the law of identity by which all the regularities of nature are to be accounted for, inexplicable? Hardly! The idea of sameness has a solid basis in the facts of experience.*

IX.

CONCLUSION.

The contrast between Determinism and Indeterminism is old, yet Mr. Peirce has worked out quite a new aspect of Indeterminism and places it upon a basis that appears to be a more solid foundation than it ever before possessed. At the same time he succeeds in making some of its consequences so plausible, that in this new garb it will appeal more strongly than before to scientifically trained minds. With all deference to the logical acuteness of Mr. Peirce and with all admiration for the originality and depth of his thought, we cannot, however, accede to the new philosophy which he proposes.

Mr. Peirce's propositions go to the core of all problems, they upset everything that has heretofore been considered as firm ground, they question the most fundamental concepts of the world-concep-

*I expect to discuss the problems of sameness, of chance, of mechanicalism, and the freedom of will in the next number of *The Monist* under the caption *The Doctrine of Necessity: Its Basis and its Scope.*

tion upon which all scientific reasoning and the methods of the positive philosophy rest. Thus they set us a-thinking and will help us to attain greater clearness on points which are to all of us of greater concern than may at first sight appear. For the fundamental problems of philosophy have a deep practical importance. Their importance is less noticeable, less obvious, but at the same time more sweeping the more fundamental they are.

Let us here in concluding this article consider only one, but the most striking one, of the consequences to which both views lead.

Indeterminism leads to a conception of God which although we may call it "mind" and place it at the beginning of the world, is pure chance or the indeterminateness of an arbitrary sporting. Determinism on the other hand leads to a recognition of God as that something in nature that is as it is, that has been and will be. Science, whose method of cognising the truth is and can only be to know in parts, attempts to describe the partial qualities of this something in natural laws.

It is of great consequence in practical life whether God is what the name Jahveh intends to convey, eternal and unalterable being, immutable sameness in the perpetual flux, irrefragable law in the changes of evolution, or whether it is the *Τυχή* of the pagans, i. e. indeterminable and absolute chance, unaccountable, irregular, capricious, and uncertain.

The God-idea is the basis of ethics. It matters little whether we use or avoid the name God, for the atheist has also a God-idea in his conception of that existence in which he lives and moves and has his being. This God-idea is always the ground from which we derive our rules of conduct; and whenever we change, not our terminology but our idea of God, we shall as a matter of consistency have to change our views of ethics also.

EDITOR.

LITERARY CORRESPONDENCE

I.

FRANCE.

PROFESSOR LOMBROSO is unremitting in bringing up new facts in support of his doctrines. His *Nouvelles Recherches de Psychiatrie et d'Anthropologie criminelle* (New Researches in Psychiatry and Criminal Anthropology) comprise a good many, gathered from the latest works relating to criminality. In adding psychiatry to anthropology in the title to this volume, writes the learned author, "I return to my starting point and to the true source of these studies, which is only a clinical demonstration, but a more perfect one, of what is called in old psychiatry, moral insanity and masked epilepsy." Lombroso may be reproached with a certain exaggeration, a certain haste, in his views respecting criminal man: yet can we conceive of an opiniated inquirer who would not have faith in his work, and who could resist the desire to generalise from the facts already obtained? But I have little doubt that the works of his school will end in producing a precise conception, which will force itself on the attention of legislators and jurists. I say *precise*, because one has a glimpse of the truth in criticising the evidence offered to us in such variety, though what one perceives sometimes vanishes.

How can we conceive of the criminal type? This is a prime question on which it is not useless to insist. Crime, as M. Tarde tells us, has become a real profession in our modern societies. Although there is some truth in it, we must not allow ourselves to be deceived by the subtle form of this paradox. There is no want of

delinquents carrying on a business; the army of crime recruits itself from all classes, it includes peasants and workmen, chemists and physicians, lawyers and merchants, soldiers and poets, that is to say, subjects possessing some one at least of the aptitudes which form a calling. We have here, then, on the one side, wretches destitute of all aptitude for a trade, and on the other men who do not adhere to the exercise of their profession, although capable of making use of it. The delinquent appears to us, in short, as stricken with some degree of professional incapacity, and if crime has become a profession in some sort, the criminals of every category first represent, if I may thus say, a professional or social waste. The study of the causes and the signs of this waste is just what has been undertaken.

The social causes of crime have often been put in prominence. They are numerous, and persons unacquainted with these questions are inclined to attribute the largest proportion of crimes and offences to distress and misery. But, according to the inquiries of Morrison, for example—and by the confession also of M. Troal, of whom I shall speak immediately—misery rarely produces crime, and if we examine carefully, one after the other, the social causes of crime, we shall soon be convinced that poverty, drunkenness, etc., feed criminality by producing degeneracy of the race, rather than that they directly arouse the criminal.* We are compelled then to seek the immediate reason for a crime in the criminal himself, and to learn to distinguish the delinquent by means of the methods fixed upon by anthropologists and physicians.

At first, as we know, Lombroso recognised only one criminal type. He has since found that there are many. The distinction between the thief and the murderer is classical. Benedikt has described the born vagabond; Brouardel, the feminine type. It is always necessary in describing a type to resort to the methods of natural history, to pass in review the emotional and intellectual characters, the physiological or functional characters, the anatomical or morphological characters, and endeavor to seize certain constant

* I reserve, as well understood, the question of education, in order to simplify matters here.

correlations between the signs one has been successful in observing. The delinquent may be described as abnormal from the emotional standpoint, and as deficient or perverted from the intellectual point of view. We could then begin by describing exactly certain intellectual and emotional types, and it is no exaggeration to say that experienced magistrates in their way have done so, those even who, with M. Proal, we shall see to be the most hostile to anthropological theories. But they are reluctant to admit any relations between the moral agent and physical nature, whereas the new school, on the contrary, makes every effort to discover and determine them.

How far is it successful? That is the question.

If we take the ensemble of the emotional and intellectual characters, we shall affirm with Professor Pelman (whose opinion Mr. Christian Ufer has made known in *The Monist*) that the portrait of the imbecile traced by Sollier corresponds strongly to that of the born criminal of Lombroso. We shall aver also that this portrait does not answer equally well for all kinds of delinquents, and that we pass gradually from the malignant imbecile to the average or mediocre man. The same observation applies when we study the physiognomical characters of which the little book of Lombroso furnishes a great variety. We shall have evidently to consider, with respect to physiognomical characters and physical marks, a strong type (certainly inborn), a weak type, and, I would add, an *acquired* type.

If we take functional anomalies—those of touch, sight, etc.—we shall be struck with their number as well as with their importance, and, I may say in passing, the alienist physicians who continue to be the adversaries of Lombroso discover every day fresh examples of them, which could give to the conception of the type, the reality they still deny it to possess. The latest discovery, and certainly one of the most striking, is that which Ottolenghi has just made, in the clinic of Lombroso himself, respecting the visual field of epileptics and of the morally insane. According to the researches of Ottolenghi, the visual field will be remarkably limited, both with epileptics not in paroxysms, and with born delinquents, but more often with the latter. They present a partial hemiopia, vertical and

heteronymous; the periphery of the field is sinuous and irregular. This discovery tends, then, to confirm the analogy of epilepsy with criminal tendencies; it will furnish a sign of the first order for a well marked category of delinquents.

Let us pass on to morphological characters. The abundance of evidence is truly extraordinary, and one cannot abstain from remarking, in this relation, that a certain number of the anomalies designated ought to be found, and indeed are found, in morally healthy subjects, and that therefore they do not alone suffice to furnish a ground of distinction from the medium normal type. As certain functional anomalies are not wanting either in many subjects whose morality remains perfect, it would be necessary to aim, it seems to me, at establishing an approximate *quantum* for the criminal type, or rather for the *kinds* which ought to lead, by sensible gradations, from the most pronounced type to that which is the least so. Some scattered elements of this work will be found in the book of Lombroso; the studies of Clouston on the palate (deformation of the palate existed in 19 per cent. of the general population, 61 per cent. of imbeciles, 35 per cent. of criminals, and 33 per cent. of madmen); the monographs of Ottolenghi and Roncoroni on the pathological anomalies of 100 criminals, with an indication of the number and the nature of the anomalies, etc.

In short, it cannot be questioned that the new school holds its ground well, since it circumscribes and makes more and more precise the object of its researches. In my humble opinion, it is of importance for it to get rid of hazardous or useless explanations, for it to tell us as little as possible of remote atavism—for if heredity is constant, it is not possible to trace it link by link as far as the deluge!—and finally for pure anthropologists and pyschiatrists to beware of themselves drawing practical conclusions from their doctrines. The applications concern jurists, and constitute a question of another kind, into which other considerations also enter.

* * *

In the juridical domain, a French magistrate, M. Louis Proal, has just published a considerable work, *Le Crime et la Peine* (Crime and Punishment) which is truly the performance of an adversary,

but not of such an adversary as M. Tarde. M. Proal is an irreconcilable, and all his dialectic—charged a little too much with citations of which many are useless or prove nothing—turns on the absolute affirmation of free-will. He flatters himself to have demonstrated freedom, in which he is wrong. It is a matter of faith, as criticists have very well perceived. Human science can know only determinism; it proves only what it finds.*

M. Proal claims then to found on free-will the two principles of the moral responsibility of the delinquent, and the moral character of punishment, in opposition to the purely social point of view in which the new criminalists place themselves. The physical anomaly of the criminal seems to him a chimera, and he goes so far as to deny, or falls little short of it, the relations of frenzied impulsion with degeneracy. Willingly, perhaps, he would accept as truly mad and irresponsible only the insane, those who are shut up forever in the asylums!

Certainly, M. Proal possesses the experience of the magistrate, he has erudition and triumphs easily, in details, by the defects and deficiencies of the doctrine he combats. His objections, nevertheless, do not touch the general conception which connects crime, in a great number of cases, with the disorders of the living machine. He is not willing for the criminal to differ from the honest man otherwise than by his inclinations and will, as though will and inclinations had no dependence on the state of our organs, and as though heredity entered for nothing into the "personal factor" of character! He is not averse to saying that moral and physical decadence is always the effect of criminality, as though it was never its

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*A ground of mutual understanding would be supplied by accepting the distinction proposed by P. Carus between *constraint*, which alone excludes freedom, and *necessity*, which leaves our will free within the limits of our character. Already Plotinus had written: "How can it be said of this being (he who obeys his nature) that he obeys, if he is not constrained to follow something external?" (6th *Enn.* lib. viii.)—I recommend to the curious on these questions the book of M. BERTAULD, *Méthode Spiritualiste, Esprit et Liberté*. M. Bertauld places freedom in *autonomy*, which is perfectly reconcilable with psychological determinism; there is on the contrary, he declares, no radical contradiction between determinism and free-will, and indeterminism is an absurd conception. The work is well written, and I do not intend to belittle it by mentioning it in a simple note.

cause! He allows with that attenuations of moral responsibility, resulting from physiological and physical influences, as though a weakened responsibility was a true moral responsibility in the sense he understands, and as though the judge had the means of deciding at what moment morbid evolution involves irresponsibility!

These absolute principles once established, he defines an offense "the violation of a social duty," and he grants that the judge "ought to take account of the importance of the social evil resulting from the crime." It is sufficient for him that the *intention* and the *responsibility* is appreciated, in order to attach the penalty to morality. In default of which, writes he, there would be no more justice. It is a noble solicitude, that of wishing to justify punishment in the eyes of the guilty person himself, and to inflict it on him as an expiation of the evil he has committed. But here an error is fallen into, which is, in my opinion, to suppose that the law punishes "morally." The law has not the power to inflict moral chastisement. It strikes the delinquent materially, in his goods, in his person; the rest depends not on the judge who applies the law, but on the judge who is in ourselves, the avenger more or less severe according to the complex incidencies of education and heredity. Moral chastisement can exist only in the conscience of the delinquent, and, if this conscience is wanting, or nearly so, all the affirmations of the judge cannot cause the punishment to have the quality of moral expiation for the guilty. The criminal will submit to it through force, and the magistrate will apply it by necessity.

Such is, I think, the true situation. The new school of criminology will introduce reforms in the practice of the tribunals and in the administration of the penal laws; it will not change justice and could not compromise morality. And now pardon me for adding to these some further remarks, in connection with the books of which I have still to speak.

* * *

The interests and the passions of men, habits too long acquired to alter, can be considered as the immediate and constant motives of societies, the *vis à tergo* of their evolution. Political theories work on a pre-existing social matter, and more or less in the direc-

tion of the tendencies which have produced the state of things that they aspire to reform or overturn. In a general manner, they possess then neither the power necessary to create, attributed to them by utopists, nor the power to destroy, which makes them appear so formidable to conservatives. Without denying all efficiency to the intellectual ideal, it is permissible to say that its action has a bearing purely conditional, and that the revolutions of growth of social organisms never absolutely depend on the theorist who establishes its diagnosis, and endeavors to regulate its march. We behold, in a word, history making itself, rather than that we make it ourselves and according to our inclination. It is hardly possible for us to foresee the remote effects of our inventions, of our discoveries. In sociology as well as in physics, man remains the servant and the interpreter of nature.

There is in this, if I am not deceived, a reason for reassuring ourselves concerning certain alarming predictions as to the future of our civilisation. In his book *La Civilisation et la Croyance* (Civilisation and Belief), the second edition of which has just appeared, M. CHARLES SECRÉTAN estimates that our societies will sink down, at least that they will neither return to a purified Christianity—a Christianity that has never yet been practised—nor restore the great principles of the free soul and of God. M. Secrétan is a brilliant writer and has a noble heart, and his book contains at least one truth of the first order, always good to repeat, which is that nothing durable is founded on hatred. He dare not flatter himself, however, that his warnings will be listened to, his lessons observed. Perhaps he exaggerates the real dangers which menace us, because he enlarges, unknown to himself, the rôle of philosophic doctrines, and attributes to the mind a kind of discretionary power over the sentiments and the interests of mankind.

Here we have the intellectualist mistake. It appears chiefly in the revolutionist propaganda which agitates our Europe, and of which M. J. BOURDEAU makes known the ideas and the progress, in a clear and interesting manner, in his work *Le Socialisme allemand et le Nihilisme russe* (German Socialism and Russian Nihilism). It is a fact well worthy of remark, that the genial promoter of the

theories of Fourier, St. Simon, and others—I refer to J. J. Rousseau —had had the conjecture of a social physiology: fragments of his that have been published show well that he did not regard the age of gold as one of savagery, and that he foresaw the part that human nature had to do in our calculations of government. What is found just in his writings could even well be intimately connected with this naturalist point of view. But he lived in the century *par excellence* of rationalism, where such ideas could be neither developed nor understood; he constructed the political world according to reasoning, and I shall not be far wrong in thinking that socialism represents in its turn, definitively, at least in its essential features, a last offshoot from this rational school which has already, a hundred years ago, made us the villainous present of Jacobinism.

Absolute communism has no chance of ever realising itself. Neither Karl Marx, nor Engels, has ventured even to indicate the possible form of the society of which they dream. The action of the socialists, in turn, could have as its result the substitution for our régime of excessive individualism and of disordered democracy, a régime of corporations and of more regular co-operation, by one of those reversions to institutions anciently delineated that history presents to us, and which respond to a sort of "law of oscillation" of social phenomena. There is no occasion, however, to give it long consideration to establish that these returns do not exclude novelty, for the apparent form of social arrangements is of less moment than the nature of the ideas and of the relations which sustain them, and here is what I would readily call a "law of progressive repetition." As to the exact sense of the evolution which there manifests itself, the great task of disengaging it falls to the sociologists. But the school of Marx has wished to see things only from one side, and his theory, which is too simple, does not embrace the complexity of the phenomena.*

Without any pretension to renew the face of the world and to

* In this relation, I will particularly refer to the great work, in course of publication, of M. B. MALON, *Le Socialisme intégral*, and I recommend at the same time the article *Justice and Socialism* of M. Belot, which has been much spoken of, in the number for February last of the *Revue Philosophique*.

interpret economic phenomena in favor of an arbitrary thesis, M. AD. COSTA, in his opuscule *Alcoholisme ou Épargne* (Alcoholism or Thrift) places before us the truly immediate question of socialism, in the presence of this "social dilemma" which reformers willingly mask in their discourses: on one side, alcoholism, life from day to day, the unreasonable and momentary illusion that one imbibes with stimulants, the wasting of daily resources, finally the pauperism which leads to social servitude; on the other side, thrift under all its forms, a provident life ordered with intelligence, abstention from dangerous stimulants, progressive comfort and increasing happiness, more and more freedom. Yes, here are the two issues between which the workers have to choose. Those who read this little book can learn there, both what milliards of salaries alcohol has devoured, and what misery both physical and moral it engenders, and the degradation that it brings to those who give themselves up to it. To many this may be only the small side of a great problem. Without thrift and the qualities which render it possible, there is neither family nor morality. How can a man pretend to possess instruments of labor when he deteriorates the chief of all, his own living machine? How can a social class have the illusion to believe that a revolution ever profits him who is neither able nor capable of preparing and conducting it?

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The last work of M. E. DE LAVELEYE, *Le Gouvernement dans la Démocratie* (Democratic Government),* published a few months before his death, treats chiefly of the organisation of public powers. This question has importance to-day, writes the learned author, only in relation to the great questions which will agitate the world of to-morrow, the social question and the religious question. Conservatives make use of government as a brake; revolutionists seek to seize hold of it as a lever. The fact is that our Europe marches towards democracy. But will democracy give us freedom? On what conditions can it form an acceptable régime and one compatible with high culture?

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* All the works mentioned in this article are published by F. Alcan.

It is not necessary for me to explain here the reasonings and conclusions of M. de Laveleye. His book, to speak the truth, is less a book than a collection of Review articles and historical sketches. The politics of action will find in it too much theory, and philosophers will regret the absence of master-ideas. It is well to read this work for its practical advice and the rich details that it contains; we must not look there for a real historical or social conception.

The sentiment which is dominant, finally, in all the writings of which I have just spoken is inquietude, and unfortunately it is only too well justified. We see, in our Occident, alcoholism increasing with salaries, the hatred of classes with wealth, immorality with enfranchisement, public burdens with political progress, the aggregation of individuals with great industry, criminality even with education. The wealth acquired is compensated for by new evils; it seems that all our conquests have the result of putting social order in peril, and that the civilisation of which we are so proud is bound, in a short time, to become bankrupt.

We have, nevertheless, a weighty capital with which to restore ourselves, and it is only right to say that it is beginning to be applied. But we must give up some errors as to which it is good time to open one's eyes. One of the gravest, certainly, is always to place instruction before education, and the mind before the heart. We have allowed to drop, at the same time with religion, the difficult task of forming moral habits. Let us understand in a word that, in a society, the most valuable thing is neither the steam engine, nor the bank note, but the man himself, and that in the man even it is not ability or special knowledge but *character*.

LUCIEN ARRÉAT.

II.

GERMANY.

In the January number of *The Monist* I mentioned a treatise written by G. Ludwigs, in which the novels of Wilhelm Walloth were criticised, and expressed my surprise that in the work discussed a personality unquestionably diseased was stamped as a poet of almost the first order. Much that then struck me as strange and was unclear to me, was later rendered plain and intelligible; and the explanation was not long in forthcoming.

As the newspapers shortly afterwards announced, Ludwigs was simply the pseudonym of a sixteen year old gymnasium student of Darmstadt, who had already attracted the attention of wider circles by the poems he had written. It happens at times that individualities of this description bear out in the advanced years of their life the promise of their youth. Extraordinary things were to be expected, though I cannot say *hoped*, of Ludwigs; but the expectation was not fulfilled. He, an instance of real decadence, yet a boy in years, voluntarily took his own life, deeply mourned by his literary associates, the "Young Germans," in whose magazine *Die Gesellschaft* a brother of the deceased is now publishing biographical notes and literary remains—novels and poems—all more of a psychological than literary interest. The biographical notes plainly mark out a personality smitten with psychosis and suffering in a marked degree with hyperæsthesia, and the literary remains reflect this mental condition; light-sensations especially playing an important rôle. His nervous system was too weak to assert itself permanently against the outer world. This pressure, which objectively considered was not at all a powerful one, did not admit of the rise of a powerful sense of life; and especially oppressive to the precocious youth was the life of the school in the most varied ways, and in an unexpected moment the flame of his life went out.

As psychologists, we should find considerable interest in the study of this phenomenon of Ludwigs. We must admire his abilities and his capacity for work, which not only enabled him to per-

form his duties as a student of the gymnasium, but also left him time enough, in addition to his literary work, to employ himself with the psychological writings of Wundt and Münsterberg, which he desired to turn to account in the field of poetry. We must mourn too his sad fate. But we have no reason to *glorify* such a diseased personality, as is done on many sides in the April number of *Die Gesellschaft*.

But this is a peculiar characteristic of the Young-German writers and their confrères abroad, that they make the diseased take the place of the sound, and the ugly of the beautiful, and thus help greatly to undermine the health of the common mind. There are it is true a goodly number of trusting souls who believe that we may regard with security and composure, the endeavors and tendencies of the naturalistic apostles, as our taste in literature and art—a few cases excepted—can surely not be reversed into its opposite. On this point, perhaps, those who so think are not wrong. But the stage may easily be reached where literary taste no longer remains determinative, and the place of the æsthetical interest in things is taken by the scientific, before whose judgment-seat no difference of the beautiful and the hideous exists.

This view is the direct outcome of philosophical materialism. The latter doctrine may at present, it is true, be regarded in all its main points as definitively overthrown, so far as philosophy is concerned ; but in the domain of *belles lettres*—a term not quite allowable here—the wave which it has created still sweeps mightily onward. Two new works seek to break its force, which have been published in the series *Gegen den Materialismus* edited by Dr. Schmidkunz (Stuttgart : Krabbe). The first treatise bears the title *Materialismus und Æsthetik* and has no less a person as author than Moriz Carriere ; the second treats of *Materialism in Literature* and is the production of the northerner Ola Hansson. I am unable to say that these two treatises have especially satisfied me. Both authors look at the subject too one-sidedly from the point of view of æsthetics, and have not by far given a sufficient recognition to the psychological aspect of the subject. I recognise indeed with Carriere, in spite of all the apparent mutability of taste, a normative æsthetics ; but

that man bears within him an ideal of life, as the seed does the plant with its blossom and its fruit, I am unable for psychological reasons to concede. I grant that I find with Ola Hansson psychology in so far poorly represented in the naturalistic literature as the growth and evolution of character is made to appear a much too simple process; and I concede furthermore that the evolution of character in the individual case is very far removed from anything like resemblance to an example in mathematics, inasmuch as quantities may be lacking us in such a case which are absolutely necessary to be taken account of for a correct solution of the problem; but these missing quantities need not for that reason be at all matters of mystery, in their true nature wholly unknown to us.

To what limits the domain of mystery has shrunk and to how great an extent its expressions may be made intelligible and to a certain degree even may be "regulated," provided, equipped with thorough knowledge, we courageously look the things in the face, is exemplified in a marked degree by a voluminous work of the above mentioned Dr. Schmidkunz. The so-called Suggestion passed for a long time as something wonderful and had to rest its defence in the hands of the representatives of a psycho-physical mysticism as opposed to a "surface"-psychology which in the words of Du Prels occupied itself exclusively with surface work without penetrating to the depths. SCHMIDKUNZ now points out in his *Psychologie der Suggestion* (Stuttgart, 1892: Ferdinand Enke) in a very comprehensive manner what others had very plainly hinted at before him, namely, that in the case of a very great number of phenomena we have, exactly viewed, to deal only with some very simple and quite explainable things which unite in the composition of what is commonly called suggestion. The contents of the work, however, are not exhausted with this; under the influence of a tremendous scope of reading, the author treats the whole domain of suggestion, and if he understood more perfectly the art of good writing, he would have earned a much greater gratitude than that which in any event is his due.

Schmidkunz touches repeatedly in his work upon a domain which still belongs to the most obscure of the history of civilisation, namely

witchcraft and the trials of witches. This topic, likewise viewed from a psychological point of view, forms the subject of a special treatise by SNELL, entitled *Hexenprocesse und Geistesstörung* (Munich, 1891: J. F. Lehmann). In this book no rôle is ascribed to suggestion, but as the title indicates the treatment centres about the question of what significance mental disorders generally may have possessed in the trials of witches. The author concedes that demented persons became the victims of the trials for witchcraft either because they had rendered themselves by their character open to the suspicion of a compact with the devil, or because they had by self-obtrusion directly drawn upon themselves this persecution, but asserts nevertheless, that the number of demented persons that fell victims to the trials for witchcraft, was comparatively very small. Mental disorder however played in so far a great rôle in the trials for witchcraft as demented persons, especially such as suffered from hysteria, became false witnesses and brought sound and healthy people into the hands of the persecuting judges.

As I am now treading the province of psychiatry, I will mention, that WILHELM GRIESINGER'S celebrated work *Pathologie und Therapie der psychischen Krankheiten* has just been published in its fifth edition under the direction of Dr. Levinstein-Schlegel, the director of the Maison de Santé in Schöneberg (Berlin: August Hirschwald). I do not of course specify this work solely for the sake of the physicians who may be readers of *The Monist*, but am rather impelled to the act by a universal psychological consideration, for Griesinger in the first edition of the work also made a name for himself as a psychologist. It appeared originally in 1845, and possessed a compass of 396 pages; the fifth edition numbers 1100 pages and has increased considerably in size as compared with the fourth. Whether the augmentations have added anything to the value of the work is a question which must first be submitted for answer to our physicians. In psychological respects its value has in so far been very much increased as the experiential data have assumed much greater proportions: the psychological analysis however has been somewhat neglected.

Psychological analysis in fact is not the strong side of the ma-

jority of our psychiatrists. What Griesinger and still more so Spielmann sought after in this direction, has been greatly forced in the background. As a general rule our inquirers content themselves with a description of symptoms and the construction of a more than copious nomenclature, in the midst of which the connections are very easy to be overlooked. Among the commendable exceptions is to be named in this respect the well-known Vienna professor THEODOR MEYNERT. In addition to his extensive psychiatrical works he has also published a considerable number of lectures and discourses partly in magazines and partly in separate brochures. These discourses are now presented in collected form in a book entitled *Sammlung von populärwissenschaftlichen Vorträgen über den Bau una die Leistungen des Gehirns* (Vienna, 1892, Wilhelm Braumüller). The most noticeable discourses are the following: The Significance of the Brain for the World of our Ideas; The Mechanics of the Cerebral Structure; On the Feelings; On Illusion; On the Significance of the Development of the Forehead; The Mechanics of Physiognomy; Brain and Culture; The Co-operation of the Parts of the Brain; On Artificial Disturbances of the Psychic Equilibrium. No words need be wasted in the recommendation of the book of Meynert.

CHR. UFER.

DIVERSE TOPICS.

PROFESSOR HAECKEL'S MONISM.

There are two Latin proverbs which are both good rules for controversialists who seek for the truth on different roads. The one reads: *In verbis simus faciles dummodo conveniamus in re*, the other reads: *In verbis simus difficiles ut convenia mus in re.* A difference of terms often prevents two thinkers from noticing that they actually agree. Therefore let us be lenient in terms and never lose sight of their meaning and purport. On the other hand terms are not indifferent, and the selection of terms should not be regarded as arbitrary. In order to arrive at a solid and permanent agreement, permanent because it is based upon objectively demonstrable truth, we have to be scrupulously careful with our terminology; and we must not allow the arbitrary employment of terms where they are inappropriate. An inappropriate usage of terms will lead us astray and involve us in confusion and error.

Says Professor Haeckel:

"The divergences which exhibit themselves in our respective unitary conceptions of the world are in part only apparent and in part occasioned by the divergent significances of our fundamental ideas."

This seems to me very true and, indeed, I have very good evidence that it is true. Professor Haeckel writes in his letter to me:

"I have marked in *red* those passages of your kind review of my 'Anthropogeny' in which I agree with you and in *blue* those in which I differ."

Now I find all those passages where I should have anticipated an objection on Professor Haeckel's part marked red, while a blue mark appears where in my opinion there is only a difference of terminology. It is the following sentence on page 441:

"Psychic life is absent so far as we can see in the primordial world-substance as it appears in the form of a nebula; it is absent still in the primordial state of planets. It appears with the subjective states of awareness that rise into existence in organised life. The subjectivity of unorganised matter is, in comparison with man's subjectivity, to be considered as a blank; i. e., if there is in it a state of awareness, which we have reasons to doubt, it is apparently without meaning; it

does not symbolise external objects; it is no mind; it is, as it were, blind. Yet the aim of evolution being the development of psychical life, shows that the subjectivity of unorganised matter is spiritual in its innermost nature."

This difference is probably a difference of terminology only, for I insist most strongly on the doctrine that all nature is alive. However, I make a difference between "life" and "soul." Nature is alive throughout, but it is not ensouled; the action of chemical elements and of the falling stone are no psychical actions.*

Another blue stroke appears at the following passage:

"We grant willingly that mechanical explanations will serve for all motions that take place in the world; even the motions of the brain take place in strict obedience to the laws of molar and molecular mechanics. But a mechanical explanation is not applicable to that which is not motion. If it were applicable it would not be desirable, for it would be of no avail. Mechanical explanations are to be limited to mechanical phenomena. Feeling however is not a mechanical phenomenon, and an idea, being a special and a very complex kind of a feeling, or rather and more accurately expressed, being the special meaning of a very complex feeling, is not a mechanical phenomenon either."

The subsequent sentences are again approved by Professor Haeckel; they are marked red:

"It is true that when a feeling takes place and when an idea is thought in the brain of an organised being, that a certain nervous action takes place. The nervous action is a motion and this motion represents a definite amount of energy. There is no theoretical difficulty, although there are almost insurmountable practical difficulties, in measuring the definite amount of potential energy that is changed into kinetic energy when a man thinks. Yet the brain-motion is not the idea and by a mechanical explanation of the brain-motion we have not even touched the problem of what the nature of the idea is, why ideas originate and how they act."

We do not understand how Professor Haeckel can object to the view that ideas and feelings are no motions. We fully grant that the nervous action that takes place when an idea is thought is a motion, and that, considered as a brain-action, it is mechanically explainable. But by feeling we understand not the brain-action but a state of awareness, and states of awareness are not objective phenomena, they are subjective phenomena; whereby we do not at all deny that there are no feelings which must not in their objective existence at the same time be supposed to be brain-motions.

Feelings are not motions but ideas are still less motions. Ideas are the meanings which certain feelings that are representative of certain sets of experiences have acquired. Is the meaning of a word a motion? Can the significance of words be mechanically explained? The meaning of ideas, the significance of words, the rep resentativeness of feelings are phenomena which have nothing to do with motions but constitute a domain of their own.

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* We intend to express our views more fully in a special article to be published in a subsequent number of *The Monist*.

Professor Haeckel in our opinion can mean only that there are no feelings in themselves, but all our feelings are at the same time brain-motions, and as such they are mechanical phenomena. We have to add, however, that an explanation of the mechanism of brain-action does not as yet explain the significance of mental operations.

Professor Haeckel insists so strongly upon his view of monism as being mechanicalism that this seems to mark a difference in our conceptions which might be of consequence.

I was very glad to notice the long strokes of red along the passages which contain my proposition that "the evolution of organised life is a natural process having a definite aim"; further, along the paragraphs concerning the world-order as being moral in so far as the world-order is the basis of morality, and also those which represent God as being that power of the world-order obedience to which is called morality.

Professor Haeckel's agreement with these passages indicates that those expressions of his to which we should take exception, and which he employs again in his article of the present number, might not be regarded as divergences.

Professor Haeckel's definition of God appears to us insufficient, and also his definition of immortality.

God is not only the sum-total of matter and force, God is also that quality of the world which the naturalist describes in natural laws. God is the life of the world, he is that feature of existence which makes mind and knowledge possible. In addition he is that which men call progress, the ideal of the future that lives in our souls and the principle of evolution in nature.

There is a deeper truth too in the doctrine of immortality. There is a conservation of matter and energy, but there is also a preservation of soul. Says Professor Haeckel, "the human soul is a very highly developed vertebral soul." If that is so, the soul of our fossil ancestors continues to live in us. This soul has been altered, it is true, but the alterations are not so much a loss as a gain. The alterations consist in the additional growth of new powers and represent a higher development. All that which was worth preserving has been preserved.

And as it has been in the past, so we can confidently expect that it will be in the future. All that is worth preserving of our souls will be preserved in the ages to come. Our souls will live and develop to higher possibilities. They will be transmitted from generation to generation, advancing on the unlimited path of evolutionary progress. P. C.

THE RELIGION OF SCIENCE.

There was during the last winter great excitement in Germany, concerning a new school-bill proposed by the chancellor Caprivi, and the late Prussian minister of cultus, Zedlitz-Trützschler. This school-bill proposed to take the direction of the public schools out of the hands of scientific men and transfer it to the

clergy. The idea of the Emperor was to let the education of the young be guided in a religious spirit. He intended to wage a war against atheism.

Among the pamphlets which were written during the crisis, is especially noteworthy the monograph of the late minister of cultus, Herr von Gosler, whom we should count among the most conservative of Prussian officials. His opposition, accordingly, is the more remarkable, and his objections had much weight with the Emperor.

The Emperor has withdrawn the bill. Nevertheless, the spirit of ultra-conservatism, which shows itself in an outspoken hostility against science, still remains strong enough, and new onslaughts upon the progressive policy in school and church, may be expected in the future. The question is timely still and will remain timely until there be a common agreement concerning the principles of education, so that our school politics may no longer be decided by and subjected to partisan strife.

Attacks that are made upon the very spirit of the institution of our civilisation and the political crises following thereupon are beneficial in one respect. They make people pause; they make them reconsider the principles by which they allow their conduct to be regulated. They make men conscious of the maxims that ought to underlie their lives and which generally are accepted by the majority without much reflection. The Prussian school-bill has indeed exercised a wholesome influence, for it called attention to the importance of principles and roused the German nation from religious indifference. During the conflict many scientists and professors of universities, who as a rule interfere little with politics, have raised their voice in warning, and many valuable ideas were expressed that found a strong echo in the heart of the people.

There are two articles written by German professors which have commanded very wide attention inside and outside of Germany. The one article was written by Professor Haeckel of Jena, in the *Freie Bühne*, the most important passages of which appeared at the time in *The Open Court*, No. 243. The other article was written by Friedrich Jodl, of Prague. It appeared first in the Augsburger *Allgemeine Zeitung*, and was republished in pamphlet form by Cotta, in Stuttgart. The former is an enthusiastic appeal to let science, which is the basis of our civilisation, remain the basis of our educational maxims in schools and universities. The latter discusses the philosophical principles of the conflict.

We are greatly in sympathy with the spirit in which Professor Jodl has treated his subject. Nay, more, we substantially agree with him concerning all main facts, and also concerning the sense in which our future development should be directed. Nevertheless there are points of disagreement, which we consider of sufficient importance to point out and explain.

The ultra-conservative party stands upon the platform that there can be no morality without religion, and no religion without dogmatism. For this reason dogmatism should rule supreme in the schools, and science should be subservient to religious creed. That this means curtailment of the freedom of investigation,

and the suppression of the liberty of science, is understood by all the parties concerned. The liberals so apprehend it, and the ultra-conservatives do not deny it. In the face of this situation Professor Jodl proposes the question, "Is there a humanitarian morality possible?" (p. 8 of the pamphlet "Moral, Religion, und Schule.") He says:

"A mere glance into the numerous anthologies of the moral wisdom of all times and centuries, shows that the agreement concerning moral ideas and norms is much greater, and it recedes much more into the dim past than is usually assumed. The writings of Laotse and Confutse, the popular literature of Buddhism, the fragments of old Egyptian law, the didactic poetry of Islam, contain a great wealth of moral wisdom, and treasures of the noblest ethical sentiment which the Christian Occident likes to regard as its own exclusive property. Especially the ancients, whose civilisation, in spite of much opposition, is still the basis of our civilisation, furnish us with a series of the most beautiful moral types and ideals, and there we find, beside many valuable features of Christian ethics, other no less valuable gems which we seek for in vain in the old Christian morality, and which were not recognised until Christianity came into contact with the Teutonic nations of northern Europe. Our ultra-conservatives argue that without catechisms humanity would stand helpless before the question of what is right and wrong, and what the growing generation should be taught in order to make them useful and honorable members of society."

In opposition to these views Professor Jodl urges that

"If society of to-day can at all tolerate that such doctrines as Christian morality are taught in our schools as the foundation of practical conduct of life, this is possible only because the ethics of the old biblical Christianity has, in the course of centuries, grown to be something quite different from what it was in the beginning. The throughout communistic, labor-abhorring, world-hating, miracle-infatuated morality of original Christianity, constantly dreaming of the collapse of the world near at hand, and suited only to the demands of the paupers of the time, could only be changed and adapted to the conditions of later periods of radically different conditions, with great difficulty. The Catholic church has done much to accomplish this purpose, and in a still higher degree Protestantism has made many concessions to humanitarian ethics and practical reason. These concessions, however, must appear from the historical standpoint, as adulterations of the Christian ideas. Exactly in the degree that Christian morality in modern times has remained a living power, it has ceased to remain Christian in the historical sense. . . . . The tendency of the whole development of the modern world is to conceive the moral norms as natural conditions of human society, and to understand them in their connection of the individual with the whole. This thought and sentiment must become in the child a living power, and morality cannot expect in this respect help from religion. Religion knows only the relation of the individual to God, as it is expressed in the mystical ideas of sin and mercy. Religion knows no duties and goals for humanity, but only for the egotistic desire of salvation for the individual. Religion knows no progress, no evolution, but only eternal life or eternal damnation. The civilised nations of Europe had to go through with many hard struggles in order to arrive at the idea that there is a humanitarian, and a natural, morality, in comparison with which all religious dogmatism must be considered as indifferent additions. Only on the basis of this conviction is it possible that there exist to-day so many religious

confessions of faith, and among them also those who are religious without having any special confession. Here lies the great duty of our time for enlightened legislation, for our schools, to take care that the universal Christian be developed from the narrow dogmatism, and, further, the universal human ideal, from the universal Christian. To expect this of the clergy of the different religious societies, would be a mistake. . . . . The theological spirit and the principle of free investigation, are irreconcilable adversaries. Every religion, of whatever denomination it may be, is stable in its very nature. It pretends to be eternal truth, and whenever it compromises with the idea of progress, it does so reluctantly, and in the form of concessions."

We agree with Professor Jodl in his opinion that our present dogmatic religions are entirely unfit to understand the demands of the present. And it is true that the humanitarian ideas of morality have been slowly developed from the crude and immature notions of the apostolic times. The aim of our moral development must be humanitarian ethics. But we disagree with Professor Jodl that we cannot expect a further evolution of our moral ideas from the clergy.

It seems to me that here lies the important difference between the old and the new world. Conditions favor religious progress in America, while the conditions in Europe cut off all hope and produce an ominous stagnancy.

The clergy of the old world, in Germany as well as in England, and in all Catholic countries, are appointed only on the condition of being ultra-conservative in religious matters, as well as otherwise. No young man whose enthusiasm would carry him so far as to suggest reforms on broader humanitarian principles, would be admitted in the church as ministers. And if he had been admitted by mistake, he would meet with a fate similar to that of the Abbé Lamennais, whose experiences are admirably described by George Julian Harney, in No. 213 of *The Open Court*.

The situation is greatly different in America. Our clergymen, our congregations, our churches, are perhaps more orthodox in many respects, and especially in their belief, than those of Europe. Nevertheless, they are more liberal in principles, and they are less obstinate concerning dogma. Most of our churches here do not even possess dogmatic creeds, or confessions of faith. The clergy of the Baptists, the Congregationalists, the Unitarians, are not bound by oath before taking orders, to believe in sundry articles and to preach certain doctrines which are supposed to be absolute truth. The Baptists, it is true, are as a rule very orthodox and very dogmatic, but they are liberal in spite of it, open to conviction, and not averse to going onward with the times. This attitude of the American clergy must appear inconsistent to Europeans who can, in ecclesiastical affairs, only judge from their own experiences. And it may be that their position is as much inconsistent as was for instance that of Newton, who considered the trash he wrote on some theological questions concerning the apocalypse as infinitely superior to his mathematical and astronomical works and did not see that the recognition of the law of gravitation would go far toward freeing humanity from many of those nonsensical ideas which he cherished so highly.

In former times I was inclined to blame the clergy for the lack of progressiveness in the churches, but I have come to the conclusion that not the clergy are to be blamed for retarding the broadening of the religious spirit, but the lay-members of the churches. I am personally acquainted with several clergymen of different denominations, Christian as well as Jewish, who conceive it their duty to point out the way of progress and to further the spirit of a scientific world-conception in religious matters. They advance exactly as quickly and exactly as far as they can in working out of the narrow dogmatism of the religious views of their flock the ideas of a broad humanitarianism.

It has often happened that clergymen, encouraged by their congregations, have grown too broad in the opinion of their narrower brethren, and it was customary, in former years, to cast them out according to the old fashion of dealing with heretics, which is still customary in European churches. The churches have become more careful here, for, whenever such a case happened, these liberal clergymen were, as a rule, not deserted by their congregations. Thus every act of removing a clergyman usually led to a schism, and it seems that, at least to some extent, the churches have of late given up their policy of removing heretics within their ranks.

This much is certain, that many among the American clergy are ready to progress with the times, and to accept the truth wherever they find it. In Europe religion is dictated to the people from above by government and church authority. The clergymen are servants of these authorities. Their consciences are not bound, as they ought to be, to teach the truth and nothing but the truth, but to teach the doctrines which their employers bid them teach. And this policy is still considered right and natural, even among liberal minded people.

In America the clergy are exponents of the views of their congregations. In Europe the congregations are separated from their pastors by a deep gap: there is no gap between the congregation and the clergy in America. Both are in the closest contact. Our congregations are more orthodox than European congregations; therefore our clergy is more sincerely orthodox, and more honestly narrow, than the European clergy. The European clergy are more scholarly, yet at the same time there may be more hypocrites among them in Europe who know better than they preach. But there is no doubt that with a further development of intellectuality and scientific insight, our congregations will become broader and more liberal and more humanitarian, and, with the congregations, our clergy are bound to develop in the same lines.

European theology is much superior to American theology in scholarly critique, in historical investigation, and in philosophical depth. Nevertheless, we must not hope from European theologians that they will undertake the great work of reform that is so much needed in our churches, which is nothing less than to reconcile religion with science; to let religion develop into a religion of science, preaching boldly and unreservedly those humanitarian ethics which stand upon the principles

of truth; that is, of scientifically proved truth, which finds the sanction of the moral "ought" in the facts of experience.

Professor Jodl says:

"The main objection of the supporters of dogmatism in school politics is this: They propose it is not so much religion that is needed in education; not the contents of ecclesiastical doctrines, but to give to morality a foundation; to give it what science calls the sanction of ethical rules. . . . From this standpoint, every attempt that is liable to weaken the ethics of religious sanction must appear equivalent to the attempt of abolishing criminal law and penal institutes, and to deliver the peaceful citizens into the hands of murderers and robbers."

Professor Jodl continues:

"The nature of religious sanction consists in this: that the moral rules are conceived as the behests of an all-powerful, omniscient being, that promises to immortal man for their fulfilment, eternal rewards, and for their non-fulfilment eternal punishment in the life beyond."

In opposition to this view Professor Jodl maintains that

"Man's morality, on the one hand, has never been preserved from error by an outlook into the beyond of heaven and hell, and, on the other hand, there have never been missing those impulses that originate in the depths of human nature working in the line of moral ideas."

These impulses are, according to Professor Jodl, the purely moral sanction of conscience. And conscience is represented as, and in another place called, "the natural sanction of morality."

This view of regarding conscience as the natural sanction of morality does not appear to us as a happy expression, and it seems to us that Professor Jodl did not intend it as it might be understood. For Professor Jodl speaks in another passage of "the natural impulses of morality as having their sanction in *experience*."

If that be so, conscience would not be the ultimate authority, but conscience would have to be regulated and corrected by a rationalised experience.

If "the natural impulses of morality have their sanction in experience," the ultimate authority would be the facts represented in experience; and the facts of experience, in their totality, are nothing more or less than the whole universe with its natural laws and conceived in its cosmical order. The universe, the All, nature, or whatever you call it, is indeed an omnipotent reality which man cannot resist, and in which he can live only by adapting himself to its laws. If this ultimate authority of the natural laws be called by the religious term "God,' we shall see at once that the old dogmatic religions express a very deep truth in mythological language. The ultimate sanction of morality is not our conscience, but that omnipotent power which resides in the objective world of realities, in the cosmical order of the universe.

We might as well say that everybody shall regard his watch as the ultimate standard of time as to make his conscience the criterion of morality. May everybody use his watch wisely and regulate it well. And so may everybody revise his

conscience and investigate diligently whether it agrees with the laws of that all-power of which we are a small part and through which alone we exist.

Professor Jodl praises very highly the French institution of a so-called purely moral instruction in the public schools. Father H. Gruber, however, points out some serious shortcomings in this system of moral education, resuling from a lack of principle. (See *Stimmen aus Maria-Laach*, Freiburg i. B., 1892, No. 4.)

It is apparent that moral commands cannot be based upon purely subjective notions or ideals, they must be based upon some objective authority which is a power that enforces obedience. Such a power exists. It is the world in which we live. It is that All-being of which we are a part. And that feature of nature which enforces that conduct which we call moral is named God in the terminology of religious language.

A consideration like this points out the way to a reconciliation between science and religion. There is a truth in the old religions, and this truth need only be purified from the errors that cluster about it, hiding its grandeur, beauty, and importance. Let the church and its authorities recognise science and the principle of free investigation; let them be ready to accept the scientific methods of research; let them be willing to accept truth as it can be proved by arguments and verified by experience as well as by experiments; and we need no longer worry about dogmatism and the narrowness of their sectarian doctrines. All these accidental features of religion will, then, pass away, and we shall have a religion which the scientist and the philosopher can embrace.

This is what we call the Religion of Science; and the Religion of Science is bound to be the religion of the future. The Religion of Science will not abolish the religions of the past, but it will develop them, broaden them, perfect them, into the cosmical religion of humanitarianism.

To teach an ethics that either has no sanction, or whose sanction is built upon the diverging opinions of individuals, will not do. Ethics must be based upon the sanction of some objective authority, and the recognition of an objective authority, of a power which enforces a certain kind of conduct, being religion, we say that no ethics can be without a religious basis.

The problem at present is not how to teach irreligious ethics—all such attempts are failures at the start; but to change the mythology of the old religions into a clear, scientific conception of the natural conditions which demand of man that he should observe those rules which we are wont to call moral. P. C.

THE FUTURE POSITION OF LOGICAL THEORY.

In last October's number of *The Monist*, Professor John Dewey gives a sketch of what in his view is "the present position of logical theory." According to this the basis of the position seems to be that "the only possible thought is the reflection of the significance of fact," and that therefore logic, which is the science of the laws of thought, rests in reality on an objective basis. He supports Hegel in de-

nying "the existence of any faculty of thought which is other than the expression of fact itself." Now it is doubtless the case that this is the position at present taken up by a large number of logicians, but as this position seems to me to be fundamentally erroneous I should like to put before your readers what I hope will be "the future position of logical theory." I have elsewhere worked out in some detail a theory of reasoning which differs from that commonly accepted chiefly in this, that it recognises not two, but three kinds of reasoning, which I call Objective, Subjective, and Symbolic. Reasoning is commonly divided into two branches, denoted by various pairs of terms, such as Objective and Subjective, Inductive and Deductive, Empirical and Formal. The lines of division indicated by these various pairs of terms are not quite identical; but they none of them indicate what seems to me the most important distinction of all, namely that between real, and symbolic argument. There *does* exist (I will not say a "faculty of thought," but) a method of argument which "is other than the expression of fact itself," whether of objective or of subjective fact. The term "formal reasoning" is indeed often used to denote this kind of argument, but this is a bad name to give it, since it seems to imply, and frequently is held to imply, that it deals with the *forms* of objective or subjective facts, whereas in reality it deals only with symbols, which are arbitrarily defined, and which do not necessarily correspond to any things whatever, whether objective or subjective. That this kind of argument not only exists, but flourishes is evident as soon as it is grasped that pure mathematics is nothing but a branch of symbolic logic. It may be that there exists somewhere a fact of which any conceivable mathematical formula might be regarded as the reflexion, but it must surely be evident that it was not to the reflexion of such facts that mathematical formulæ in general owe their existence or validity. It may perhaps be true "that fact, reality is significant," and even that thoughts are themselves such significant realities, but it is the thoughts that are given to us first, or rather sensations which are the elements of thoughts, and we can only infer the realities from them, and not *vice versa*.

The essence of my theory of logic may be briefly stated thus. The meaning of a logical term contains two parts, its denotation and its connotation. Either of these parts may be laid down arbitrarily as its *definition*, leaving the other part which I call its *import* to be found out by experience. To understand both parts of the meaning of any term is therefore to possess real knowledge. Pure symbolic reasoning deals only with the definitions of terms, and is not therefore founded on real knowledge, nor can it alone ever lead to real knowledge. Thus if in any proposition the definitions of the terms are deducible from one another, the proposition may be proved symbolically and is what I call a truism: it gives no real information. But if the definitions of the terms are independent of each other, and yet not inconsistent, the proposition can only be intended to assert the identity of the imports of the terms; it therefore ascribes import to the terms and gives real information, whether true or false. If any terms in a symbolic argument are however

known to have real import, it may be ascribed to them in real propositions, and any conclusions of the argument which contain only such terms will *ipso facto* be made to yield real information, which may be new in the sense that it was not before recognised, though it was of course implied in the real assertion or assertions which ascribed import to the terms of the symbolic argument.

It is in this way possible to separate any science into two branches, one of which consists purely of symbolic argument founded on definitions alone, while the other may be expressed in a series of propositions, the definitions of whose terms are independent of each other, and which ascribe real import (whether objective or subjective) to the terms of the symbolic science, or some of them.

This is as far as pure logic can go. The question how the truth of any real propositions comes to be known is not, in my opinion, any part of logical theory, but belongs to metaphysics. However that is no reason for not discussing it here, especially as it is the chief question discussed in Professor Dewey's paper.

"Truth" means some sort of consistency in a proposition. We may compare a symbolic argument to a game with counters, the rules of which are laid down arbitrarily, and to say that a given conclusion of such an argument is true only means that the game has been "played fair." But the truth of a real proposition does not depend on any arbitrary rules. It expresses a consistency between two real facts, either that two named groups of things possess certain common attributes, or that certain of the things possessing named groups of attributes are identical. The essential element of all real knowledge is then a connecting link between a thing and an attribute, such as is afforded by a well-understood word.

Now the only "things" which we can apprehend directly are our subjective sensations and conceptions. We can compare two or more sensations or conceptions, and recognise in them common attributes. Thus I can say of my own knowledge that the sensations I denote by "the taste of sugar" and "the taste of lead acetate" have a common attribute, which I call "sweetness." This is a real assertion, for its truth is not deducible from the definitions of its terms, and yet I know, by direct apprehension, that it is true. But it is only a subjective truth. The corresponding objective assertion would be sugar and acetate of lead both produce, when tasted, the sensation of sweetness. And I have no direct apprehension of this fact. That the tastes referred to in the former proposition were produced by objective things denoted by the terms sugar and acetate of lead, can only be inferred by the process called induction, which can never lead to a positive or necessary truth.

Thus we may from a pure symbolic science proceed one step further, to a subjective science, by the aid of direct apprehension, and the results of such a subjective science may in certain cases attain the position of absolute, or necessary truths. But on the other hand, all objective sciences must rest on induction. Now the true nature of induction is, I am persuaded, commonly misapprehended, because it is not realised sufficiently clearly that the prime data of induction are not them-

selves objective, but subjective facts. An "objective fact" is really only an hypothesis, postulated to account for certain of our subjective sensations. The only justification for making such an hypothesis is that it actually does explain certain sensations, and the measure of its probability (for we can never assert it as a necessary certainty) is the number and complexity of the sensations which it accounts for. The first of all such objective hypotheses is that we have an objective environment to whose action our sensations, or some of them, are due. This suggests at once a more general hypothesis, commonly known as the law of causation namely that the conditions obtaining in the objective universe at any one moment are the effective causes of those obtaining at the next, and so at any subsequent moment. These two hypotheses, together with certain subsidiary ones, do suffice to account for an enormous number, if not all, of our sensations, and so we are justified in entertaining them. But to leave out the notion of *effective* causation, and to substitute a mere rule of sequence, is to remove the only justification we have for assuming the hypothesis of causation at all. It is perhaps conceivable that the hypothesis may be false, that our sensations are not "caused by" an objective environment but if so what reason remains for believing in that environment at all? I can never know anything whatever about an objective universe, unless some of my sensations about which alone I know anything directly, are caused by that universe. It is perhaps thinkable that there should be an objective universe in which events occur which in no sense *cause* my subjective sensations, but to which those sensations nevertheless happen to correspond; but if this is so the sensations afford me no ground whatever for believing in the occurrence of the events, or the objectivity of the universe.

Well then, the essence of induction is the assumption of an hypothesis to account for observed facts—first of all of directly observed sensations, and then of facts assumed to be objective in virtue of the primary hypothesis. That this account of induction is the true one is I think particularly enforced by the consideration of those cases to which at first sight it does not seem to apply. A common example of induction is afforded by our belief that the sun will rise to-morrow. That it has risen every morning for the last four thousand years or more is no reason whatever for believing that it will rise to-morrow, unless it is held to point to some explanatory hypothesis. Such an hypothesis has actually been framed by astronomers, and no one would now pretend to found his belief in the sun's rising to-morrow on the mere fact that it has often risen before, but would go on to explain that it must rise unless the earth were to stop revolving, etc. If at Monte Carlo the red turned up ten times running, would that be any reason for expecting it to turn up again, the eleventh time? No, it would not unless the succession of reds seemed to point to some explanatory hypothesis, such as a defect in the roulette. Again, the fact that in the last fifty years the death rate in London has been about twenty-eight per thousand would be no reason for believing that it will be about that figure this year

except on the assumption that the constancy of the death rate indicated certain constant causes, which we have no reason to believe have been altered this year.

Having once assumed that our environment is objective, and as a corollary the hypothesis of causation, the whole of physical science follows, step by step. Subsidiary hypotheses are introduced at each stage and justified by the way they account for observed results. To show how a single hypothesis is capable of explaining a large number of observed results, the full meaning of the hypothesis is elucidated by symbolic reasoning. By such reasoning it is for example shown that the same hypothesis, of universal gravitation, is capable of accounting, not only for the movements of the stars, but for the tides, the flow of rivers, the falling of unsupported bodies, the rising of baloons, the movements of the balance in Cavendish's experiment, and so on. That such wide extensions of an hypothesis are possible tends greatly to confirm, not only the hypothesis itself, but the fundamental hypotheses of objectivity and causation also. But it does not prove either the one or the others. We cannot know anything about the objective universe with absolute certainty, but we may reasonably believe a certain hypothesis about it with any degree of conviction we think suitable; that is we may (and of course we actually do) act on all occasions *as if* we knew absolutely that they were true.

We may then believe, and I for one do believe, not only in the objectivity of the universe, but that even my own subjective sensations are mere bye-products of that universe. I *believe* that objective facts are, if I may so express it, more real than subjective sensations; that in fact the objective universe might have existed, and might exist again without any subjective element in it anywhere. But I cannot *know* this, it is with me a matter of faith. Thus I cannot agree with Hegel, that "all possible thought is the reflexion of the significance of fact" (except perhaps in the sense that thought is the reflexion of the significance of certain changes in the grey matter of the brain) for this would seem to imply that stupid or contradictory thoughts reflected stupid or contradictory significance in certain facts. But I believe that men of science are gradually evolving a system of thought which will more and more faithfully reflect the significance of fact, and that thus science is actually building up truth. But all science must begin with, and be founded upon, subjective knowledge, and therefore any theory of positivism contradicts itself for it must be founded on faith. Science is thus founded on faith, faith in things not directly apprehended, just as truly as religion is. It is only because we unconsciously acquire this faith in our infancy, and that it is in most cases amply justified by subsequent experience, that we do not even recognise the fact that it is faith, in exactly the same sense that belief in God is. But just as men have sometimes lost their faith in God, so it may happen to a man to loose his faith in reality, and logic is quite as incapable of shaking a man out of the one position as out of the other.

This I take it is the key to the agnosticism of such men of science as Mr. Huxley. I do not for a moment suppose that Mr. Huxley believes less than most men; he probably has good grounds for believing a great deal more. Only he

rightly refuses to say that he *knows* facts of which he can have had no direct apprehension and which he can only infer more or less probably, to be true. Hypotheses which as we push our investigations are shown to be capable of explaining more and more facts, that is, ultimately, more and more sensations, will in the end come to be believed in without doubt or hesitation. If a man says he *knows* the law of gravitation to be trne, he commits a logical blunder; but there is nothing to prevent a scientific man from believing in any miracle or prodigy, so long as the account he gives of it does not contradict itself. Not only may two equally reasonable men form very different estimates of the probability of the same event, even with the same evidence before them, but one man may put his faith to a proposition with admittedly much lower degree of probability than would be required to convince another. Only, a scientific man will always distinguish between what he knows and what he believes, and will admit that though he has made up his mind to act *as if* he knew to be true the propositions he only believes to be so, yet another man may reasonably take a different view of any one of them.

Trin. Coll., Cambridge, Jan. 8, 1892. EDWARD T. DIXON.

COMTE AND TURGOT.

On page 410 of the last number of *The Monist*, it was stated that the doctrine of the three stages of knowledge was not properly a Comtean idea but belonged to Turgot. The following letter from Professor Schaarschmidt of Bonn informs us of the passages in Turgot where the statement of the doctrine is found:

To the Editor of The Monist:

To your note of inquiry of the 22d of last month I have the honor to reply, that the Comtean theory of the *trois états* may be traced back to utterances of Turgot made by him in his *Second discours sur les progrès successifs de l'esprit humain prononcé le 2me décembre 1750*—namely in the Sorbonne. You will find the discourse referred to in the edition of the works of Turgot which I now have before me, namely that of Guillaumin, Paris, 1844, in Vol. II, at pages 597 et seqq. The passage in question is found at p. 600-601. However, it is highly probable that the so-called *loi des trois états* was *directly* transmitted to Comte by St. Simon, who reproduced the idea of Turgot in his *Introduction aux travaux scientifiques du XIXme Siècle*, at pages 62–63. For Comte was dependent in many respects on St. Simon, while it is probable that he had never studied Turgot. To St. Simon, in fact, is due the expression "philosophie positive," as well as the germ-notion of the division of the Sciences, which Comte further elaborated.

SCHAARSCHMIDT.

BOOK REVIEWS.

DARWIN AND AFTER DARWIN. I. THE DARWINIAN THEORY. By *George John Romanes*, M. A., LL. D., F, R. S. London: Longmans, Green & Co. Chicago: The Open Court Publishing Co. 1892.

In the present work by Professor Romanes, who may be regarded as the special exponent of Darwin's theory of organic evolution, we have a complete and systematic presentation of "Darwinism according to Darwin." It is the outcome of a course of lectures delivered by the author in 1889 before the Royal Institution, London, and forms only part of a much more extensive treatise on the Darwinian theory, embracing the early history of biology, and a discussion of the further developments of the theory subsequent to the death of the great naturalist who gave it birth. The present part is limited to what is distinctly Darwinian, dealing with it and with the main objections raised against the general theory of organic evolution it enforces.

The subject naturally divides into two parts, and Professor Romanes accordingly deals with it in two sections, in the first of which he considers organic evolution as a fact, stating the main evidences in support of the doctrine, while in the second section he furnishes "the evidences which thus far have been brought to light touching the causes of organic evolution considered as a process." The author points out in his introductory remarks, that in order to establish a theory of a continuous transmutation of species, which is what is meant by organic evolution, it is not necessary to furnish proof of *all* the natural causes which have been at work The issue is between the theory of a supernatural cause, as operating immediately in numberless acts of special creation, and the theory of "natural causes as a whole whether these happen, or do not happen, to have been hitherto discovered." Moreover, the discussion is concerned only with the origin of species, and not with that of life, as to which the author says with truth, "although in the opinion of most biologists it is a question which we may well hope will some day fall within the range of science to answer, at present, it must be confessed, science is not in a position to furnish so much as any suggestion upon the subject; and therefore our wisdom as men of science is frankly to acknowledge that such is the case."

The idea of evolution implies continuity, and the author refers to the fact that the uniformity of nature's method in the production of phenomena to which continuity is due, recognised in other fields of science, strongly recommended the theory of organic evolution for acceptance on merely antecedent grounds. There is another important fact, from the antecedent point of view, to which Professor Romanes draws attention. He states it in the words of Mr. Wallace, who lays down as a general law that "every species has come into existence coincident both in space and time with a pre-existing and closely allied species." This is a necessary consequence of natural evolution, but no reason can be assigned for it on the theory of special creation, and the existence of such a correlation may be regarded as a test-question between the two theories.

The direct evidence in favor of organic evolution brought together in the first section of the present work is considered under the several heads of classification, Morphology, Embryology, Palæontology, and Geographical Distribution. As to the first of these subjects, the object of classification has been the arranging of organisms in accordance with their natural affinities. Organisms have been compared for the purpose of ascertaining which of the constituent organs are of the most invariable occurrence, and therefore of the most typical significance, and the author shows that "all the general principles and particular facts appertaining to the natural classification of plants and animals, are precisely what they ought to be according to the theory of genetic descent; while no one of them is such as might be —and indeed, used to be—expected upon the theory of special creation." In connection with the important subject of Morphology, the author, after showing that the theory of descent with continued adaptive modification fully explains all the known cases of divergence from the typical structure which an organism presents, devotes himself especially to the argument from rudimentary structures. These are of such general occurrence that they are found in every species, and such obsolescent or vestigial structures, as the author terms them, are of great value as evidence for the theory of evolution, particularly those found in adult man. To human vestigial structures the author pays particular attention, his observations being accompanied by excellent illustrations from nature. It is noteworthy that he abandons the flattening of the tibia in man, and the disposition of valves in human veins, as arguments in support of man's natural origin, which is abundantly supported, however, by reference to other rudimentary organs.

The science of Embryology is of special importance, on account of the history it affords of the *process* of evolution, and thus supplying evidence of the fact, although the author remarks, "the foreshortening of developmental history which takes place in the individual lifetime may be expected often to take place, not only in the way of condensation, but also in the way of excision." To understand the argument from embryology it is necessary to trace the first beginning of individual life in the ovum, and for this purpose to consider the phenomena of reproduction in their most simple form. In connection with this subject, Professor Romanes,

after examining the features in which the cell-division of protozoa differs from that of metazoa, and after considering the grounds on which it may be concluded that there is a physiological continuity between growth and sexual reproduction, points out that the constructive argument in favor of evolution derived from embryology commences with the fertilisation of the metazoal ovum. As this first stage has not been adequately treated by any other writer, the author deals with it at considerable length. The later stages of individual development, including that of the vertebrata, on the lines of Haeckel's ideal primitive vertebrate, are more concisely treated. The science of embryology, covers the whole field of animal life, and it is not surprising therefore that it is considered by the author and other evolutionists as furnishing the strongest support to the theory of evolution.

As to the palæontological evidence, Professor Romanes does not ascribe to it the paramount importance which it has in popular judgment. Nevertheless he asserts that, not only is no positive proof against the theory of descent to be drawn from a study of palæontology, but it proves two very important general facts in favor of it. These are that from the earliest to the latest times there has been a constant and progressive increase in the diversity of types both of animals and plants, and that "through all these branching lines of ever-multiplying types, from the first appearance of each of them to their latest known conditions, there is overwhelming evidence of one great law of organic nature—the law of gradual advance from the general to the special, from the low to the high, from the simple to the complex." These general facts are supported by detailed consideration of fossil horns, bones, teeth and shells, which supply four special lines of evidence. The evolution of mammalian limbs with particular reference to the hoofed animals is treated with a fulness its importance requires.

As the geological argument is concerned with the distribution of species in time, so that based on the present geographical distribution of animal and plant species is concerned with their distribution in space. This, although not regarded by the author as a crucial test between the rival theories of creation and evolution, is declared to be one of the strongest lines of evidence in favor of the latter. The general facts relied on are, the discontinuity of distribution of certain species, the absence of any *constant* correlation between habitats and animals or plants suited to live upon them, and the presence in every biological region of species related to other species in genera, and usually also genera related to other genera in families; this correlation between a geographically restricted habitat and the affinities of its fauna and flora being repeated over and over again throughout the earth's surface. But further, the correlation between habitats and their animals and plants is not limited to the now existing species, that is, the dead and living species are allied, showing that the latter are modified descendants of the former. Moreover, where the areas of distribution are not restricted, through species wandering away from their native homes, the course of their wanderings is marked by the origination *en route* of new species. Another important consideration is that a double correlation

exists in the geographical distribution of organic types. That between the geographical restriction and natural affinity among inhabitants of the same areas has already been mentioned. The second is the correlation between *degrees* of geographical restriction and *degrees* of natural affinity. This is consonant with the theory of descent with modification, as "the more distant the affinity, and therefore, *ex hypothesi*, the larger and the older the original group of organisms, the greater must be the chance of dispersal." These general considerations are supported by detailed illustrations drawn from the distribution of aquatic and terrestrial organisms. The author shows that an examination of the faunas and floras of oceanic islands establishes the general law "that *wherever* there is evidence of land-areas having been for a long time separated from other land-areas, there we meet with a more or less extraordinary profusion of unique species, often running up into unique genera." There is, moreover, a constant correlation between the *degree* of this peculiarity, and the time during which the fauna and flora have been isolated. The author concludes this part of his argument by the forcible observation that "if the doctrine of special creation is taken to be true, then it must be further taken that the one and only principle which has been consistently followed in the geographical disposition of species, is that of so depositing them as to make it everywhere appear that they were not thus deposited at all, but came into existence where they now occur by way of genetic descent with perpetual migration and correlative modification."

The second part of this work, that which treats of selection, under the two heads of Natural Selection and Sexual Selection, although in some respects the most important, does not need to be noticed so fully as that which deals with the facts of natural evolution. After stating the theory of natural selection, the author notices various fallacies connected with it which are largely prevalent among the adherents of Darwinianism, although nowhere fallen into by Darwin himself, and the still greater fallacies found in the writings of his opponents. In the two following chapters Professor Romanes, after stating the main arguments in favor of the theory of natural selection, reviews the main objections which have been urged against it. The first argument is that, as a matter of observation, "the struggle for existence in nature does lead to the extermination of forms less fitted for the struggle, and thus makes room for forms more fitted." The second argument, which the author considers of overwhelming significance, is that there is not a single instance, in either the vegetable or the animal kingdom, of a structure or an instinct which is developed for the exclusive benefit of another species. Its importance may be judged by the fact that Darwin considered that a single instance to the contrary would invalidate the whole theory of natural selection. The third argument is based on the facts connected with the variation of animals and plants under domestication. Ocular evidence of the value of this argument is furnished by a series of drawings prepared for the present work representing varieties of pigeons, and of eight other animals. As special illustrations of natural selection the author considers the subjects of protective colouring, warning colours, and mimicry. In referring to his

treatment of the criticisms of the natural selection theory, in the course of which he deals with the main objections, we cannot do more than mention that based on the possession by the skate of an electric organ, which, owing to the weakness of its discharges, cannot apparently be of any use to the animal. This difficulty seems to be unexplainable according to the principles of natural selection, and Professor Romanes, in admitting the fact, remarks that it is of a magnitude and importance "altogether unequalled by that of any other single case—or any series of cases—which has hitherto been encountered by the theory."

The last chapter of the work is devoted to the consideration of the theory of Sexual Selection, which was suggested by Mr. Darwin to furnish a scientific explanation of the wide generality of beauty in organic structures. It is an observed fact that sexual selection does take place among the higher animals, and it is inferred that, the selection has reference to an æsthetic taste on the part of the animals themselves; and that this cause is adequate to explain the phenomena of beauty presented by such animals. After stating the evidence in favor of these conclusions, the author considers at length Mr. Wallace's views on the subject. These constitute the objections urged against the theory of sexual selection, of the truth of which, however, Darwin shortly before his death expressed himself as remaining firmly convinced.

Professor Romanes concludes his present volume with a few general remarks on the philosophical relations of Darwinism to the facts of adaptation on the one hand and to those of beauty on the other. In none of these, says the author, do we meet with any independent evidence of supernatural design, although there is abundant evidence throughout organic nature of natural causation. And yet natural causation furnishes no disproof of the existence of a Supreme Being. The whole of organic and inorganic nature is made subject to one rule of government, but "the ulterior and ultimate question touching the nature of this government as mental or non-mental, personal or impersonal, remains exactly where it was." Moreover, if there be an intelligent First Cause, of whose Will all secondary causes are the expression, their operation must be uniform, so far as the Will is consistent, and therefore it must appear as what we call mechanical. Thus according to the pure logic of the matter, "the proof of organic evolution amounts to nothing more than the proof of a natural process."

In an appendix to Chapter V, Professor Romanes offers suggestions as to the imperfection of the geological record, and meets various objections against the theory of organic evolution on that ground. But we must now leave this excellent work, which will undoubtedly answer the expectation with which it was prepared, of being "a compendium, or hand-book, adapted to the requirements of a general reader or biological student, as distinguished from those of a professed naturalist."

It is enriched by a very good portrait of Darwin, in whose footsteps the author has sought to tread by "avoiding dogmatism on the one hand, and undue timidity as regards general reasoning on the other." In his introductory observations he

dwells on the remarkable influence exercised by Darwin over the method of investigation of organic nature, by treating the discovery or accumulation of facts, not as an end, but as a means for generalisation, thus bringing natural history into a line with other inductive sciences.

The value of the work is materially increased by the addition of numerous well executed original illustrations, besides various plates derived from Haeckel's works and other sources, some of them American. It has also a good Index which will add much to its usefulness. Ω.

GRUNDRISS DER NATURLEHRE FÜR DIE OBEREN CLASSEN DER MITTELSCHULEN. Von Dr. *E. Mach*. Ausgabe für Gymnasien. Mit 358 Abbildungen. 315 pp Vienna and Prague: F. Tempsky. Leipsic: G. Freytag.

The principles that have guided Professor Mach in the preparation of these outlines of Physics, are in the main as follows:

The concepts and notions of physical science should not be set forth dogmatically, but should be presented as much as possible under the influence of the actual natural facts that lead to them. Hypotheses and theories should be employed only when actually necessary. Long mathematical developments and pages of formulae only impede the scholar's total view of his subject and afford of themselves no insight. *Logical* finish should not be sought after in elementary presentations; the method of the inculcation of truths should, so to speak, be *psychological:* the method of their acquisition.

From the brief statement of these guiding principles, the reader will observe that Professor Mach's conception of the proper form of an elementary text-book, differs greatly from that usually entertained. The method of presentation is not the dogmatic, the "logical," which sets forth a science as a ready-made and perfected, mystically created, product; but the genetic, the historical, the natural. We are constantly made aware, in the study of this book, of what knowledge really means and what it does not. We are not treated, in its introductory chapter, as we are in most of the text-books of Physics, to disquisitions on the insolubility of the questions What is Matter, What is Energy, What is Force, and to like professions of metaphysical ignorance, which make us wonder how people can request us to read hundreds of pages about things it is impossible to have knowledge of; but we are presented throughout with a simple statement and description, in terms of facts, of what our fundamental, as well as our derived, notions *are*, and what their import. It is unnecessary to say that the need of such a book is very great. And it is pleasant, constantly to discover how well its idea has been executed. Concise, unburdened by unnecessary and self-evident developments, it is in our judgment a model of elementary exposition.

With characteristic modesty, Professor Mach disclaims all pretension to having fully realised his conception, and views his performance simply as an attempt. The book was submitted, before publication, to a number of competent educators, whose advice in regard to alterations was frequently acted upon. μκρκ.

NOUVELLES RECHERCHES DE PSYCHIATRIE ET D'ANTHROPOLOGIE CRIMINELLE. By *C. Lombroso.* Paris: Felix Alcan. 1892.

Prof. C. Lombroso's activity reaches a climax that is almost superhuman. He contributed to the Italian Archives of Psychiatry two articles, one of which proves that, at least in Italy, the sense of touch is weaker in women than in men; it is still weaker and more irregular in criminal women than in normal women. (Archiv. di. Psichiatr. Sc. pen. ed. Antrop. Vol. XII, 1891, p. 1–6). The other article (l. c. p. 58–108) is an inquiry concerning thought-transmission, which contains besides a critical review of the usual rubbish of so-called telepathic phenomena two strange observations. The first is the case of a low-bred hysterical lad who does not possess the faculty claimed by him to understand telepathically the intentions of whosoever employs him, but strange enough, if sufficiently charged with whiskey, is able to read any writing through the envelope with closed eyes. The other case is a somnambulistic compositor, who sets type correctly in the state of somnambulism. Blindfolded he draws the figures drawn behind his back upon a slate, and hypnotised he guesses the numbers which the experimenter thinks. Lombroso is one of our greatest psychologists, but these experiments perhaps with the same subjects should be repeated by other psychologists so as to make sure of their correctness. Lombroso concludes that there seems to be some foundation in thought-transmission.

The present little volume of new researches applies Lombroso's theories concerning morphological abnormalities of the criminal type in the anthropological field. It appears natural that the criminal type should show abnormal features, but sometimes Lombroso's eagerness to discover abnormal features, even in political criminals such as Charlotte Corday, is exaggerated. At least we must confess that many abnormalities appear very frequently among peaceful and law-abiding citizens. The Corday skull, although a trifle platycephalic, is beautifully rounded and normal. M. Topinard finds no abnormal features but Lombroso maintains that its platycephaly is doubly abnormal and he adds: "The capacity of the skull is 1.360 cubic "centimeters while those of Parisian women is 1.337. Must we not conclude that its "capacity exceeds the average?" We read on p. 124 and sq: "The more our "women will be forced to enter the economical struggle for existence, the more "will they become criminals. . . . The result (of letting them enter public life) will "be to lower the nature of women."

The booklet is very instructive even to those who disagree with the professor, for it is full of facts and valuable observations. κρς.

VORLESUNGEN ÜBER DIE ALGEBRA DER LOGIK. (Exakte Logik.) By Dr. *Ernst Schröder.* Erster Band mit viel Figuren im Texte. Leipsic: B. G. Teubner. 1890.

Professor Mach says, "The essence of science is economy of thought." If that is so, there is no discipline more imbued with the spirit of science than algebra. When operating with algebraic symbols we cease to think out the whole calculation

at every stage, and we are enabled to keep track of the different factors, and of their mutual relations during the operation from the beginning to the end. In common arithmetic these factors are lost like rivers in an ocean of homogeneous numbers which increase and decrease without betraying the way by which they were reached. Algebraic symbols generalise calculation, and thus we have the advantage of calculating from the resultant formula any particular example with machine-like exactness and without the trouble of going over the whole operation again. The ease with which we can operate with symbols brings it about that we sometimes out-run our thought and the correct result may be obtained by an operator who only partially understands the operation, just as an engineer is able to run a machine the mechanism of which he but partially understands.

Mathematics having gained so great advantages through the introduction of algebraic symbols, the question suggests itself whether the same method might not with some advantage be introduced into the other provinces of formal science, especially in the domain of logic. The first logicians who borrowed signs from algebra and introduced them into logic by generalising their meanings, were two Germans, Gottfried Ploucquet and Johann Heinrich Lambert. Ploucquet wrote "Principia de substantiis et phaemonenis, accedit methodus calculandi in logicis ab ipso inventa, cui praemittitur commentatio de arte characteristica universali," Frankfort and Leipsic, 1753, ed. II. 1764.* Lambert's investigations on the subject are found in his "Logische Abhandlungen." Prof. Venn, in his "Symbolic Logic." p. xxxii, says of Lambert, "He fully recognised that the four algebraic operations of addition, subtraction, multiplication, and division, have each an analogue in Logic; that they may here be respectively termed aggregation, separation, determination, abstraction, and be symbolised by $+$, $-$, $\times$, $:$. He also perceived the *inverse* nature of the second and fourth as compared with the first and third; and no one could state more clearly that we must not confound the mathematical with the logical signification."

The algebra of logic which through the work of these ingenious men, had received so favorable a start, was very soon neglected; yet it was revived after some time in England by Boole, DeMorgan, and Jevons. It remained for quite a while the almost exclusive property of the English where at the present time Prof. Venn may be considered as the greatest English authority on the subject. Venn's works were rivalled by an American scholar, Mr. Charles S. Peirce, the same who has contributed several articles to *The Monist*. The algebra of logic which had been so long neglected in Germany, is now reviving in the country of its first birth. The author of the work, the first volume of which lies now before us for review, is Professor of Mathematics at the Polytechnicum of Karlsruhe in Baden. The second volume is not yet worked out in detail, but its publication may be expected in one or

* See Aug. Friedr. Böck, *Sammlung von Schriften, welche den logischen Calcul des Prof. Pl. betreffen*," Frankfort and Leipsic, 1766.

two years. The whole work, when completed, will be the most comprehensive treatise on the algebra of logic that has as yet appeared. The plan and treatment of Professor Schröder's "Vorlesungen über die Algebra der Logik" exhibit that uncommon thoroughness and exhaustiveness, for which German scholars are justly famous. The book, in one word, will be the standard work on the algebra of logic for a long time to come.

It would lead us here too far to review or to sketch the main contents of Professor Schröder's work, which, it seems to us, is difficult to explain without entering into the details and thus going beyond the scope of mere review. But we shall briefly set forth the chief foundations upon which Schröder builds his algebra of logic. Professor Schröder has inscribed two mottos on the title page of his book, but we confess that we suspect at least one of them is intended to be ironical; it certainly seems to have been selected when the author was in a mood of humor. Being conscious of the great value of theoretical speculation, he quotes from Goethe the following Mephistophelian sentiment:

> "I say to thee, a speculative wight
> Is like a beast on moorlands lean,
> Led circling there by some malicious sprite
> While all around lie pastures fair and green."

There are two kinds of speculation: first, that which attempts to find out by pure thought a substantial extension of knowledge; and secondly, that which investigates the methods of inquiry. The former is futile, the latter is fruitful. The former is that which Goethe censures. To censure the latter would be a grave mistake. The man who would try to forge bread out of iron must meet with disappointment, but the smith who invented and shaped the plow did more for the production of bread than many thousand farmers taken together, although it may be he did not raise a blade of wheat. Speculation that attempts to find out things by mere brooding is *prima facie* wrong; but speculation that constructs the methods of investigation is the basis of all progress in science.

The other motto of Schröder's book is Goethe's saying: "Man is not born to solve the problem of the world, but to seek for the point where the problem begins and then to keep within the limits of the comprehensible." It would be well to compare this saying of Goethe's with another one by the same author which is "Man should hold fast to the belief that that which seems incomprehensible, is comprehensible. Otherwise, he would not investigate." Schröder follows rather the spirit of the second than that of the first quotation. He says on p. 105 of the recent volume. with reference to some critical remarks made by the late Professor Lotze of Göttingen, who was more brilliant and ingenious than exact in his philosophical views and who showed an undisguised dislike for any severe method that has recourse to numbers, figures, schedules, or classifications, as does the algebra of logic: "If Lotze concludes his logic with the wish that German philosophy should "rise to the attempt at comprehending the course of the world instead of merely

"calculating it, we should answer, Could we first calculate it, then we should cer-"tainly comprehend it so far as comprehension on earth is possible." But how is it possible? Simply by properly limiting and defining the field of investigation; and here we can see that the first saying of Goethe's should not be construed in such a way as to appear contradictory to the second.

Every thinker starts with certain limits of comprehension, but he extends them so that the stock of knowledge increases in every generation, and there is no probability that we shall ever reach the limits of an absolutely incomprehensible. There is no solid progress to be made by making wild raids in the domain of the unknown, a method which is pursued only by dreamers and metaphysicians. We must start from the boundary of the present stock of knowledge, and let our progress be confined to single well defined and limited problems. How a solution of the world-problem is possible in this sense, is explained by Schröder on p. 103: "The answer is given in the old parable of the bundle of arrows, which resists all "attempts at breaking it. As a whole it withstood, but it yielded to him who un-"tied the bundle and broke the arrows singly. The difficulties which present them-"selves to the progress of knowledge can also only be overcome singly, and in their "one-sidedness. In the division of labor thus produced, lies exactly the advantage "and the strength of the diverse disciplines,—*qui trop embrasse, mal étreint.*"

Professor Schröder advertises his book with the following words:

"From the title the reader will observe that here the deductive or formal logic "alone, is treated. The calculative treatment of the deductive logic, through "which this discipline is redeemed from the fetters by which through the power of "habit, word-language has bound the human mind, should deserve, more than any-"thing else the name 'Exact Logic'! This method alone can give to the laws of "valid inference, their most pregnant, concise, and clear expression, and is thus en-"abled to reveal numerous and important gaps,—why not mistakes,—in the older "presentations of the subject."

"Since the appearance of the author's 'Operationskreis des Logikkalkuls,' "this method of treatment has made progress of highest importance, especially "through the works of the Americans, Mr. Charles S. Peirce and his school. To "Mr. Peirce, more than to anybody else, is due the merit of having built a bridge "from the older and purely verbal treatment of our discipline to the new calcula-"tive method; a bridge which the professional philosophers rightly found lacking "and to which lack is well to be ascribed the fact that the new method received only "a partial and bewildered attention. Through Mr. Peirce's works, upon which "also the author has had some influence, the theory is now so far developed and "perfected that for the first and main part of its whole system, a final presenta-"tion and arrangement may be obtained."

"Endeavoring to offer so far as possible such a final and comprehensive pre-"sentation, the author desires to offer at the same time and in a systematic way a

"hand-book of the most valuable materials of the literature of the subject which "especially in the English language, is quite considerable."

The book addresses two kinds of readers which are of a greatly different turn of mind, and it will go far in reconciling the methods of both, the mathematicians and the philosophers.

In the preface Schröder says, "In consideration of the formulæ which ap- "pear in the book, it may be wise to state, that no mathematical training or any "specific knowledge is presupposed to be known by the reader. We might re- "peat the words of Dedekind, prefixed to one of his books: 'Everybody can un- "derstand this work who is in possession of what is generally called, common- "sense.' But we may add another saying from another author: 'The beaux esprits "certainly, who are not accustomed to the severe demands of thought, will very "soon turn away from it."

The introduction is comparatively long, comprising no less than 125 pages. But, considering that it is more than an introduction, that it explains the foundation on which the whole work rests, it is not too long, for it forms an essential and indeed the most important part of the book. Schröder discusses in it the character and the limitation of his problem. He explains induction, deduction, contradiction and valid inference. He considers the nature of signs and names. He says, on p. 38: "Humanity, it appears, does not rise above the absolute zero of civilisa- "tion and the level of animal life, until it develops the activity of denotation and "symbolising. And there is indeed nothing to which the human mind owes so "much for its progress as to the signs of things."

"The sign which speaks in attitude and gesture to emotion, speaks in word and "sentence to the intellect. And it possesses, in accordance with the laws of the as- "sociation of ideas, the power of producing in the person addressed certain ideas."

"While the sign coalesces with the idea, it reacts upon thought itself. Through 'signs the ideas which otherwise would remain confused and vague, are analysed "and they become as separate elements, a permanent possession over which the "thinking mind has forthwith free control. Through the sign we distinguish, we "fix differences and make them ready for new peculiar combinations. The sign, "is as it were, the handle by which we take hold of the objects of thought. Through "the sign only, the idea is liberated from the elements of sense, which are attached "to it, and is enabled to rise into the sphere of generalisation. Thus thinking is on "the one hand liberated, on the other determined by the sign.

"Further, through the sign alone which makes it possible that the same idea "the same purpose can live in many, there is *one* will, *one* soul, and a community "of human aspirations exists upon which is based the life of mankind as a life of "individuals in society. And this again is the basis of our morality and civilisa- "tion.

"The efficacy of the sign spoken is considerably increased by the invention of 'writing."

Professor Schröder discusses those two methods of logic which are known by the names: the Logic of Intension and the Logic of Extension. (*Logik des Inhaltes*, and *Logik des Umfangs*.) This leads to a discussion of definition, the categories, and conceptual writing which would find its ideal in a system of pasigraphy, or universal language, for the perfection of which an algebra of logic would be indispensable.

The symbols employed by Schröder are borrowed to a great extent from Peirce, but they are considerably improved and it is probable that Schröder's innovations will be universally accepted.

We purposely refrain here from discussing the particulars of Schröder's work, stating only in a general way that his proposition of a new symbol for subsumption, (he proposes to replace the old symbol $-<$ by $\leqq$ to signify "equal to or subsumed under"), his treatment of the symbols 0 and 1, the former representing an absence of certain marks, or as it has been called their "incompossibility," as being excluded by the presence of other marks; the other the universe of the whole subject under discussion, and all the other problems which he separately treats in his lectures are admirably presented and command almost throughout the reader's consent. We now conclude our review with the quotation of the last paragraph of Schröder's introduction on p. 125. Having declared that "logical inquiry should not be judged from the short-sighted or narrow-minded, not to say *borné*, utilitarian standpoint," he points out the great practical importance of his science, saying:

"Similarly, as with other sciences, so logic also may be expected to realise and "produce undreamed of results, which may incidentally bring about, in a most sur- "prising way, incalculable advantages. Let me only point out one thing. Since "the impulse which this science has of late received, there have been already con- "structed three logical machines which although we grant, scarcely deserve their "name, because their efficacy remains still very rudimentary, may be compared to "Papin's pot that in a more advanced state became the steam-engine. Indeed, "nobody can presage whether after all a thinking machine might not be constructed, "which would be analogous to, but more perfect than the calculating machines. "The latter have relieved man of a considerable portion of much fatiguing thought- "work, just as the steam-engine has been successful in relieving him from physical "labor."

"To be sure we must not expect to reap while we are still sowing, and least so "in such a case as this where the harvest is to be expected from trees." κρς.

THE GRAMMAR OF SCIENCE. By *Karl Pearson*, M. A. With 25 figures in the text. London: Walter Scott, 24 Warwick Lane. Imported by Charles Scribner's Sons, New York.

We are greatly in sympathy with the methods and principles of Professor Karl Pearson's "Grammar of Science." The work is a comparatively popular and also brief exposition of the modern ideal of scientific inquiry. "The goal of

"science is clear—it is nothing short of the complete interpretation of the universe. "But that goal," adds the author, "is an ideal one—it marks the *direction* in "which we move and strive."

The best part of the book is in our opinion the introductory chapter which sets forth "the scope and method of science" and shows the need of a "Grammar of Science." Says the author in the summary of this chapter:

"The scope of science is to ascertain truth in every possible branch of knowl- "edge. There is no sphere of inquiry which lies outside the legitimate field of "science. To draw a distinction between the scientific and philosophical methods "is obscurantism."

The present generation is in a state of fermentation. While one man finds a restlessness, a distrust of all authority, a questioning of the basis of all social institutions and long established methods, another pictures for us a golden age in the near future. One teacher propounds what is flatly contradicted by a second. We require some guide in the determination of our actions, and not for our own private but also our public duties. "Every citizen is thrust into an appalling maze of so- "cial and educational problems; and if his tribal conscience has any stuff in it, he "feels that these problems ought not to be settled, so far as he has the power of "settling them, by his own personal interests, by his individual prospects of profit "or loss. He is called upon to form a judgment apart from his own feelings and "emotions if it possibly may be—a judgment in what he conceives to be the inter- "ests of society at large."

"How is such a judgment to be formed?" The answer is by science. Such a judgment can only be based on a clear knowledge of facts, on an appreciation of their sequence and relative significance. The judgment based upon them ought to be independent of the individual mind which examines them, and this frame of mind which is that of the scientist is an essential of good citizenship. Not as if the scientist were *eo ipso* a good citizen, but society has an interest in the propagation of the methods of modern science. Sound citizenship will be promoted by training the mind to an exact and impartial analysis of facts.

How much a grammar of science is needed can be learned from the confusion that prevails concerning the fundamental concepts of science. Says Pearson:

"Anything more hopelessly *illogical* than the statements with regard to force "and matter current in elementary text-books of science, it is difficult to imagine; "and the author, as a result of some ten years' teaching and examining, has been "forced to the conclusion that these works possess little, if any, *educational* value; "they do not encourage the growth of *logical* clearness or form any exercise in sci- "entific method."

"The views expressed in this *Grammar* on the fundamental concepts of sci- "ence, especially on those of force and matter, have formed part of the author's "teaching since he was first called upon to think how the elements of dynamical "science could be presented free from *metaphysics* to young students."

Professor Pearson calls attention to the danger that arises from two modes of thought, viz. that of the metaphysician and that of the agnostic. He says:

"The poet is a valued member of the community, for he is known to be a "poet; his value will increase as he grows to recognise the deeper insight into na- "ture with which modern science provides him. The metaphysician is a poet, "often a very great one, but fortunately he is not known to be a poet, because he "clothes his poetry in the language of apparent reason, and hence it follows that "he is liable to be a dangerous member of the community. The danger at the "present time that metaphysical dogmas may check scientific research is, perhaps, "not very great."

Fortunately the danger that arises from metaphysicism is past. "For," adds Pearson, "The day has gone by when the Hegelian philosophy threatened to "strangle infant science in Germany;—that it begins to languish at Oxford is a "proof that it is practically dead in the country of its birth. The day has gone by "when philosophical or theological dogmas of any kind can throw back, even for "generations, the progress of scientific investigation."

The scientist will, it is true, often have to confess: "There I am ignorant." But it would be absurd to restrict science to the limited field of thought which it occupies to-day. Professor Pearson continues:

"It is true that this view is not held by several leading scientists, both in this "country and Germany. They are not content with saying, 'We *are* ignorant,' but "they add, with regard to certain classes of facts, 'Mankind must *always* be ig- "norant.' Thus in England Professor Huxley has invented the term *Agnostic*, not "so much for those who are ignorant as for those who limit the possibility of "knowledge in certain fields. In Germany Professor E. du Bois-Reymond has "raised the cry: '*Ignorabimus*'—'We shall be ignorant,' and both his brother and "he have undertaken the difficult task of demonstrating that with regard to certain "problems human knowledge is impossible. We must, however, note that in these "cases we are not concerned with the limitation of the scientific method, but with "the denial of the possibility that any method whatever can lead to knowledge. "Now I venture to think that there is great danger in this cry: 'We *shall* be ig- "norant.' To cry 'We are ignorant,' is safe and healthy, but the attempt to dem- "onstrate an endless futurity of ignorance appears a modesty which approaches "despair. Conscious of the past great achievements and the present restless ac- "tivity of science, may we not do better to accept as our watchword that of Gal- "ilei: 'Who is willing to set limits to the human intellect?'—interpreting it by "what evolution has taught us of the continual growth of man's intellectual powers."

The introductory chapter presents the general plan of Professor Pearson's book. The following chapters contain the detailed work of the plan. The headings of these chapters are: II, The Facts of Science; III, The Scientific Law; IV, Cause and Effect—Probability; V, Space and Time; VI, The Geometry of Motion;

VII, Matter; VIII, The Laws of Motion; IX, Life; X, The Classification of the Sciences.

Professor Pearson follows Professor Ernst Mach in his expositions (especially in Chap. II) very closely, and especially refers to the latter's contributions to *The Monist*. Pearson emphasises with Mach the distinction between the conceptual and perceptual, between ideas or noumena and sensations. He rejects, as does Professor Mach, the assumption of unknowables beyond our groups of sense-impressions, saying: "It is idle to postulate shadowy unknowables behind that real "world of sense-impression in which we live" (p. 88), and yet he says in another passage on p. 134: "There is mystery enough in the chaos of sensations and in its "capacity for containing those little corners of consciousness which project their "own products, of order and law and reason, *into an unknown and unknowable "world.*"

It appears to us that the deeper reason of this apparent inconsistency can be traced to the author's conception of the import of knowledge. He follows Kirchhoff in the acceptance of the theory that scientific law is a brief description of facts in mental shorthand. But at the same time he follows Clifford and Mach too closely; the former in the respect that we can know the "how" only and not the "why," and the latter in overlooking the fact that concepts are symbols which stand for something and have a meaning. Pearson says on p. 145, "Science describes how they [motions] take place, but the *why* remains a mystery." But should we not, we ask, rather supplant the old and metaphysical conception of the "why" (the sense of it as here implied) by a better and more correct conception? The metaphysical "why" is not so much a mystery as it is the incorporation of an illegitimate problem. The "why" of positive science demands as answer an exhaustive description of those conditions which as the outcome of a definite transformation inevitably produce a certain phenomenon.

But here we must criticise Professor Pearson's view of "description," as well also as his view of causation. Cause and effect are to him, as they were to Mill, mere sequences; necessity belongs exclusively to the conceptual realm, and is "illogically transferred to the world of perceptions."

An exhaustive description will trace the process of causation, and whenever we succeed in this we have answered the question "why" in the only sensible meaning it possesses. Sense-impressions do *not*, as Professor Pearson expresses it, "shut us in," so that the beyond remains a mystery to us. Sense-impressions represent the beyond of reality and they represent it in such a way as to enable us to deal with it properly. This representation is knowledge and thus the world is *not* unknowable. The world is full of mystery, but knowledge itself is not mysterious. Having sense-impressions and interpreting them in our conceptual inferences we know something of the world.

We are not prepared to accept Professor Pearson's views that "change is perceptual, motion conceptual," and also that "we are not compelled to postulate a

space outside of self for phenomena" (p. 196). We should say that our concepts, the concepts motion and space included, represent certain features of reality. We might give a special name to those features of reality which are represented by the terms motion and space, but we could not deny their objective reality without at the same time denying the validity of the concepts.

Says Professor Pearson, "All things move—but only in conception" (p. 385). "What moves in conception is a geometrical ideal, and it moves because we conceive it to move." These propositions have no meaning if pronounced from our standpoint. Observe also that Professor Pearson inculcates the conceptuality of motion by unnecessarily repeating the word in the formula on page 341 which begins as follows: "Every corpuscle in the *conceptual* model of the universe must be *conceived* as moving. . . ." When we conceive something as moving we mean that not only in the conceptual model, but also in reality there is an action taking place which we represent by the concept motion. To say that we have knowledge only of changes but that we do not know whether those changes which we describe as mechanical are really motions, appears to us idle subtlety. The point is whether this method of describing those events enables us to deal with them properly. If it does it answers the purpose.

In spite of all our disagreements we feel ourselves in close contact with the author of "The Grammar of Science," for we agree with respect to the principles of science and we certainly can leave the settlement of our differences to a common test on the basis of these principles. Moreover, the attitude of the author seems to us very much like that which we take ourselves. We quote from a former publication of his, the following passage *:

"I set out from the standpoint that the mission of Freethought is no longer to "batter down old faiths; that has been long ago effectively accomplished, and I, "for one, am ready to put a railing round the ruins, that they may be preserved "from desecration and serve as a landmark. Indeed I confess to have yawned over "a recent vigorous inditement of Christianity, and I promptly disposed of my copy "to a young gentleman who was anxious that I should read a work entitled: *Natural Law in the Spiritual World*, which he told me had given quite a new width "to the faith of his childhood."

κρς.

PHILOSOPHIE DER ARITHMETIK. Psychologische und logische Untersuchungen. By Dr. *E. G. Husserl*. Erster Band. Halle-Saale: C. E. M. Pfeffer. 1891.

The present volume does not pretend to be a complete system of the philosophy of arithmetic, but it attempts to prepare, in a series of psychological and logical investigations, the scientific foundation for a future construction of this disci-

* The book from which we quote, namely *The Ethic of Freethought*, like the book here under discussion, contains much detail matter in which we differ most emphatically from the author; (he is, for instance, in our opinion very unjust to Martin Luther;) but it seems to us that he pursues an aim that we have in common with him.

pline, which would be of equal value to the mathematician and philosopher. The first volume which is now before us analyses in its first part the ideas plurality, unity, and number, so far as they are directly given us and not in their indirect symbolisation. The second part considers the symbolical representations of plurality and number, and the author attempts to show that the fact of our being almost throughout limited to symbolical ideas of number determines the meaning and the purpose of that view which the author calls "Anzahlenarithmetik."

The author criticises several theories which in different ways explain the origin of plurality and unity. There is one theory which explains the origin of the unit from the unity of consciousness; there is another one which explains the origin of number from a succession in time. F. A. Lange bases his theory of number upon space-conception, and Bauman declares there is something mathematical in the external world which corresponds to the mathematical in us. The theory of difference held by Jevons, Schuppe, and Sigwart, is declared to be superior to all others, but even that is rejected by the author. Jevons says, "Number is but another name for diversity. Exact identity is unity, and with difference rises plurality. . . . Abstract number then, is the empty form of difference." Dr. Husserl objects: if numbers are all empty forms of difference, what makes the difference between two, three, four, etc.? The contents of these numbers are very different. The inability of defining this difference shows the imperfection of the theory of difference. Dr. Husserl proposes what he calls "collection" as a special method of combination by which unities are formed.

Although the book contains many valuable suggestions, it is very hard reading. The author's views are not at all clearly set forth. Neither is the table of contents so systematically arranged as to give us a clue to the plan of the book, nor is there any index that might give us assistance in finding out the most characteristic passages. The reader is supposed to read the book right through, in order to understand detached chapters or even sentences. And even then we are not sure whether or not we have understood the author's propositions the consistency of which is not as apparent as it might be expected. For, after having criticised so many attempts at explaining and analysing the ideas, plurality, unity and number, and after having proposed definitions, explanations, and analyses of his own, we find on p. 130 a passage where these ideas are incidentally declared to be incapable of definition. Speaking of Frege's theory, Dr. Husserl says, "As soon as we come down to elementary concepts, all definition has an end. Such concepts as quality, intensity, place, time, etc., cannot be defined. The same is true of elementary relations, and of those concepts upon which they are founded. Equality, similarity, gradation, whole and part, plurality and unity, etc., are concepts which are utterly incapable of a formal-logical definition. All we can do in such cases is to produce the concrete phenomena from which they have been abstracted, and to explain the method of this process of abstraction. One can, where it is necessary, exactly fence in (umgrenzen) by diverse circumscriptions, the concepts in question,

"and thus prevent confusion with kindred concepts." We must confess that we do not understand the author's idea; what is an act of defining if not an "umgrenzen," a fencing in of the concept? The book contains many similar passages, which, it seems to us, are not properly thought out by the author. But the subject is a difficult one, and, as the author says in the preface, "A work of this kind should, with regard to the difficulties of the problem it treats, be judged with leniency."

κρς.

CHRISTIANITY AND INFALLIBILITY. Both or Neither. By the Rev. *Daniel Lyons*. New York: Longmans, Green & Co., 1891. Chicago: A. C. McClurg & Co.

This little book of Dr. Lyons's is got up in a much more substantial and prepossessing form than the majority of the works that come from Catholic quarters. It contains 284 pages and is supplied with the *Nihil obstat* of a Catholic "censor deputatus" and with the *Imprimatur* of the Bishop of Denver. In this book, therefore, the reader may be sure that he possesses a correct exposition of Catholic doctrine.

The purpose of Dr. Lyons is to establish the thesis,—a thesis always insisted upon by the Catholic church,—"that Christianity, to maintain its rightful hold on "the reason and conscience of men, needs a living, infallible Witness to its truths "and principles; a living, infallible Guardian of its purity and integrity, and a liv-"ing, infallible Interpreter of its meaning." By Christianity Dr. Lyons means "that body of sacred truths which the Almighty revealed through the *ministry* of "Christ and His Apostles."

We italicise the word "ministry," for on this word hinges in our judgment the main and unmistakable argument of Dr. Lyons's advocacy. If the results of modern Biblical criticism are at all true, the "Church," so-called, must have existed before the New Testament. And in establishing the authority of the church, the Catholic theologians regard and use the Bible merely as an "historical narrative, "whose trustworthiness (at least in the parts quoted) can be proved in the same way "as that of any other history, sacred or profane." They take their argument "for "the institution, mission, and authority of the Church from the Bible as a mere "human record of the sayings and doings of our Divine Lord and His Apostles." What is the mission of the church? "*And he said unto them. Go ye into all the "world, and preach the Gospel to every creature. He that believeth and is baptised "shall be saved, but he that believeth not shall be damned.*" These are awful powers, and awful are the sanctions placed by the same Divine letter-patent in the hands of the institution that dispenses them. And in the face of the great complexity and peculiar nature of the Holy writings, in view of their recognised liability to manifold and multifarious interpretation, does not such a great and fearful commission of power as this necessarily and logically imply a concession of Infallibility—of infallibility, let us add, as *technically* understood. "Who can suppose that God would "formally commission anybody to teach in his name and command all to hear and

"accept His teaching under the severest of penalties, and at the same time not se-
"cure that teacher against the possibility of teaching error for truth? Suppose the
"Church thus commissioned by God did actually teach error, even then would not
"all (there is no exception made), by reason of the divine command, be bound to
"believe? And in that case would not God Himself be accountable for the erro-
"neous belief? I conclude, therefore, that the formal commission to teach the Gos-
"pel in God's name, and by His authority, joined to the express command to be-
"lieve carries with it a pledge of the divine assistance of Infallibility as a guarantee
"to all men that in yielding the obedience of faith, they are perfectly secure against
"all danger of error." This inference is incorporated in a dogma, a "Catholic dogma," of infallibility, which is this: "that the Pope, by virtue of a special super-
"natural assistance of the Holy Spirit of Truth promised to him, in and through
"St. Peter, is exempt from all liability to err when, in the discharge of his Apostolic
"Office of Supreme Teacher of the Universal Church, he defines or declares, in
"matters of or appertaining to Christian faith or morals, what is to believed and
"held, or what is to be rejected and condemned by the faithful throughout the
"world. This definition substantially embodies the whole Catholic teaching on the
"subject of Infallibility."

Dr. Lyons's arguments are well put and well reasoned out. He sees clearly where the vulnerable point of the present condition of the Christian churches lies,—which the majority of Protestant theologians do not see. He sees clearly, though he does not say it, that the rococo superstructure of neo-Christian dogmatism was long and long ago undermined by science and that it is now toppling in the minds of the unscientific generally; and he justly advises all who have set their hearts on the preservation of the subtle and irrelevant externalities of religion, to forsake their ancient dwelling-place and seek a safe and easy abode in the grandly simple and grandly spacious, Roman temple of Papal infallibility. That edifice is safe against the artillery of science. It has by one simple act placed itself beyond the reach of all scientific attacks. For science, or rather the *method of science*, directly owes its origin to the consciousness of our individual liability to error and the consequent aspiration of man to establish an *objective* criterion of truth. If it attempted to demolish doctrines of infallibilily of any kind, it would simply seek to justify its own foundations, which it has long ago done. In so far as the doctrine of infallibility is the only logical outcome of a dilemma in which the Christian church has, discreetly or indiscreetly, implicated itself, science has no objection to it; or for that matter to any other conclusion that logically results from premisses it does not grant. The question really most worthy of the attention of the "thoughtful," "truth-seeking," and "religious" mind, as Dr. Lyons styles it, is not the doctrine of infallibility, but the questions, What is religion, What is God, etc., etc.; and such questions the *truth*-seeking mind will find it impossible to answer arbitrarily: it must, perforce, answer them in conformity with that objective criterion of truth called science. And such subjects are as much the object of science as are motion and matter. μκρκ.

DER SATZ VOM GRUNDE ALS PRINZIP DES SCHLIESSENS. By Dr. *Franz Erhardt*. Halle a. S.: C. E. M. Pfeffer. 1891.

This little pamphlet of fifty-six pages, written and published to acquire for the author the *venia legendi* at the philosophical faculty of the University of Jena, treats the several figures of the syllogism from the standpoint that the middle term of the premisses is, logically considered, the consequence (*Folge*) of the subject and the reason (*Grund*) of the predicate in the conclusion. A few remarks are added on induction and analogy, without, however, entering into the problem as to the rôle which the method of induction plays in the evolution of the method of deduction. κρσ.

AGNOSTICISME. Essai sur quelques Théories pessimistes de la Connaissance. By *E. de Roberty*. Paris: Félix Alcan.

By the publication of this little book M. de Roberty redeems a promise made in his larger work, on the philosophy of the present century, already reviewed in *The Monist* (January, 1892). The pessimist theories of knowledge of which he treats are the three systems, those of Criticism, Positivism, and Evolutionism, to which he reduces contemporaneous philosophy. As these systems are regarded as parallel manifestations of a common stock of beliefs and general hypotheses, they must equally adopt the doctrine of Agnosticism. It is the aim of the present work to point out the several forms assumed by this doctrine and to show its falsity by an examination of the principles on which it is based. The author properly insists on the importance of distinguishing between the affirmation of the unknown and that of the unknowable. The recognition of the former is essential to all progress in knowledge, but the latter is "the direct negation of all possibility whatever of utilising the deficiencies of knowledge," and leads infallibly to the worship of ignorance. The best definition of the mental phenomenon of agnosticism, says M. de Roberty is the *pessimism* of the theory of knowledge, and it is not for nothing therefore that Kant preceded Schopenhauer in the development of idealism.

Modern agnosticism is based on the old notion of the separation of the phenomenon from the noumenon, and it was Kant who cleared it from its early theological and metaphysical conceptions. He affirmed the reality of the "thing in itself" as a fundamental postulate, and then declared that we can know nothing of things considered in themselves. Among the conceptions formed by the human mind through the exercise of its imaginative faculty are three which exhaust the entire content of the Unknowable. Thus it may be reduced to the idea of a reality other than that of which we are sensible; to the idea of a subject which perceives in a different manner from the real subject; and finally to the idea that our cerebral organisation reveals the world to us under delusive colors, all of which M. de Roberty declares to be simple fiction. His own ideas on the subject will appear later on.

Positivism stands towards materialism in the same relation as criticism stands towards idealism, whose noumenon becomes the unknowable thing in itself; as the simple matter of materialism becomes the unknown existence about which positivism says we can neither affirm nor deny anything. Modern agnosticism may be regarded thus as representing the long sought synthesis of the purest materialism and the most transcendent spiritualism, and it offers a striking demonstration of the fundamental equivalence of the hypotheses hitherto formulated as to the origin and essence of things. It proves also, says M. de Roberty, that the great law of the identity of contraries is applicable directly to all our very general conceptions. Contradictory as they seem to be, universal postulates must, by virtue of that law, be fundamentally identical. This introduces a discussion of the antinomies, developed but not invented by modern criticism, which found in them ample justification for its conclusion of the reality of the unknowable.

The double antinomy of time and space is regarded by the author as always presenting itself under the aspect of a long chain of contradictions which are manifestly merely verbal. The opposition between finite and infinite may be resolved into the distinction between concrete and abstract, between particular and general, if infinity is taken as synonymous with, or the perfect substitute for, general and abstract quantity, the universal attribute of things isolated from the things themselves. As to the problems connected with the ideas of a vacuum, matter, force and motion, M. de Roberty supposes them to have a purely psychological solution. Such ideas go beyond the "conceptive" capacity of mechanics and belong to psychology considered, not as a branch of philosophy, or as philosophy itself, but as a science of abstract concepts.

The philosophy of evolution, although monistic in the sense that it recognises the law of the identity of opposites, shows itself not to be so in reality by its doctrine of the unknowable. In this monism and agnosticism contradict each other, as it is contrary to reason "to affirm at the same time the identity of every phenomenon and their unknowability. The first marks the supreme term of the second. Identity in general serves to define knowableness. So that, if we remain on the elevated summits of pure abstraction too long, we run the danger anticipated by the law of identity of contraries. We fall directly into the error of taking the apparent negation of identity or of pure knowledge, the unknowable, for something really distinct, really separated from the knowable." This is the illusion of Spencer and of all the philosophers who have undertaken the difficult task of applying monism as a corrective of agnosticism.

M. de Roberty concludes the present work with a discussion of the relation between idea and reality, the thought and the object thought of, in which he gives us his opinion on that disputed point. He says that what philosophy calls "the object" is composed essentially of external nature, in which is included our own organism. Very complicated systems of motions are transmitted to the grey nuclei or opto-striated bodies of the central regions of the brain. Here these motions de-

termine new motions of which the totality is described in psychophysics by the term "unconscious ideation." But this internal motion, continually tending to become again an initial or external motion, gives rise to unconscious reflex activity. The motion passes by the white nerve-fibres to the cortical periphery of the brain which becomes "the seat of a phenomenon, an excitation, a motion which prolongs or repeats the immediately preceding phenomenon, excitation, or motion, while giving it a shorter and more steady action." The sensations and the reflex-actions derived from them traverse the opto-striated nuclei without retardation and without giving rise to any system of ideas; while consciousness resides in the systemisation or union of the same sensations and reflex-actions. The notion of the ego results from the union or memory of certain ideas, sensations, and actions, which before their union and preservation by the cerebral cortex were unconscious. But before becoming unconscious ideas, those "intellectual virtualities" were in every other part of the organism, and in all the media which surround it, as, "manifestations of energy or of motion, it may be objective phenomena." Thus, says M. de Roberty, if the universe is composed of two parts, the ego and the non-ego, it can be affirmed that they form an uninterrupted circuit. He supposes that when the cosmical energy has produced the phenomena of unconscious mentality in the brain-centres, it is divided into two currents, one of which returns to its source and becomes directly cosmic energy again, and this will be the fate of the other current also when the life of the organism ceases.

This view the author supports by a consideration of the morphological and functional difference supposed to exist between the facts which constitute the notion of the "ego" and the primordial facts of unconsciousness comprised under the generic denomination of the "non-ego." He regards conscious ideas as the telegraphic alphabet, the stenographic writing of the cosmos. Consciousness serves to coördinate the incoherent crowd of events which at each instant invades the normal brain. In these we may see effects of the cause called "universe," and therefore its representatives and substitutes, which they could not be unless there was identity between the two. Thus the "ego" could be defined as the final synthesis of the "symbolic abridgments," of the micrographical abbreviations, of the "non-ego." Thus the ego serves only for the purpose of concentrating or condensing, so to say the non-ego, which it represents in a manner more or less durable and efficient.

This monistic theory gets rid of the unknowable and therefore is a great improvement on that of the materialist or of the idealist. Nevertheless it requires further elaboration. There is no difficulty in understanding that cosmic motion may become transformed within the organism into a feeling. This still, however, leaves unaccounted for the existence of the organism itself. A true monism will, therefore, require that the organism must be in some way identifiable with the cosmos. This is the true problem that has to be solved, and its solution will be greatly aided by the overthrow of agnosticism, against which M. de Roberty has made so vigorous and successful an attack in the present volume. Ω.

PERIODICALS.

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. III. Nos. 2 and 3.

UEBER DIE EMPFINDLICHKEIT DES GRÜNBLINDEN UND DES NORMALEN AUGES GEGEN FARBENÄNDERUNG IM SPEKTRUM. By *E. Brodhun.*

KÜRZESTE LINIEN IM FARBENSYSTEM. By *H. v. Helmholtz.*

DIE RAUMANSCHAUUNGEN UND DIE AUGENBEWEGUNGEN. By *Th. Lipps.*

EINE BEOBACHTUNG ÜBER DAS INDIREKTE SEHEN. By *Th. Wertheim.*

UEBER EINIGE EIGENTÜMLICHKEITEN DES TASTSINNS. By *G. Sergi.*

BEITRÄGE ZUR VERGLEICHENDEN PSYCHOLOGIE. I. Das Verhalten wirbelloser Tiere auf der Drehscheibe. By *K. L. Schaefer.*

GEGENANTWORT AUF DIE ERWIDERUNG VON O. FLÜGEL. By *J. Rehmke.*

LITTERATURBERICHT.

The value of the first article on the sensitiveness of the green-blind and the normal eye in perceiving color-variations in the spectrum consists mainly in the three diagrams that exhibit the results obtained in the author's experiments.

Professor H. v. Helmholtz published in a former number his attempt at propounding "a formula which should play the same part in the province of color-sensations as the formula of the length of the linear element plays in geometry." . . . As geometry begins with the concept of a shortest line between two points, so our fundamental formula in this subject shall enable us to find that series of transitions between two given colors for which the sum of the perceptible differences is a minimum. Helmholtz proposes to call them "shortest color-lines" and comes to the conclusion that the whole domain of these apparently irregular phenomena are easily subsumed under a generalised formulation of Fechner's law.

Professor Th. Lipps criticises Wundt with regard to the latter's theory of measuring the visual field by ocular motion. Wundt's theory, he declares, is in need of several auxiliary hypotheses, such as the assumption that certain ocular motions are supposed to be more difficult than others: the visual field is said to possess the form of a spherical surface, etc. The author maintains that ocular motions do contribute to the construction of our space-conception, but in a different way than Wundt assumes. The most interesting part of the article appears to be the discussion of the genesis of the third dimension which is not given in the data of sensation but added to them as a judgment concerning these data. It is an interpretation of the data. There are still psychologists who regard the third dimension as immediately given. Professor Lipps refers as an instance to Prof. William

James's article "The Perception of Space" in (*Mind*, Vol. XII), where the latter declares that "no arguments in the world can prove a feeling which actually exists, to be impossible." While Wundt says that to the resting eye the form of the visual field is spherical because the sky appears to us as spherical; Lipps declares that we might just as well say that the visual field of the resting eye is a plane, because the earth appears to us as a level surface. We attribute to the visual field the form which certain reasons prompt us to. Certain convergences of the eyes induce us to place certain points at certain distances. We read, as it were, the distances out of the convergences of the ocular axes. Accordingly, when we cease to feel any difference in our feeling of convergency we cannot help attributing the same "depth" throughout to all the things with respect to which such feeling is wanting, and we place all objects beyond a certain range upon a spherical surface. Thus Lipps interprets the spherical form of the firmament as the result of our using both eyes, which use from habit has become the form of monocular vision also, and not as Wundt does from the spherical form of each visual field, which by habit has been transferred to binocular vision. There is a strange fact that distances on the left side are overestimated in comparison with those on the right side; and this fact is also claimed by Professor Lipps to be incompatible with Professor Wundt's theory, but in favor of his own views.

Th. Wertheim has made an observation which tends to prove that positive as well as negative fluctuations of light-intensity, cause the disappearance of objects indirectly seen.

G. Sergi publishes the results of his investigations concerning the sense of touch made in the Institute for Anthropology and Experimental Psychology at the University of Rome.

Karl L. Schaefer's results of experiments with invertebrate animals upon the rotatory table show that in the beginning a counter-rotation takes place, but not in all animals. It does not take place in some caterpillars; it does take place in black beetles, ants, flies, earwigs, provided they are at the time in actual motion. There is no after-affect from the rotation and thus they are not subject to vertigo as are the vertebrates. (Hamburg and Leipsic: Leopold Voss.) *κρς.*

VIERTELJAHRSSCHRIFT FÜR WISSENSCHAFTLICHE PHILOSOPHIE. Vol. XVI. No. 2.

BEITRÄGE ZUR LOGIK. (Zweiter Artikel. Schluss.) By *A. Riehl.*

ERNST PLATNER'S WISSENSCHAFTLICHE STELLUNG ZU KANT IN ERKENNTNISSTHEORIE UND MORALPHILOSOPHIE. (Zweiter Artikel. Schluss.) By *B. Seligkowitz.*

UEBER BEGRIFF UND GEGENSTAND. By *G. Frege.*

BEMERKUNGEN ZU RICHARD AVENARIUS'S "KRITIK DER REINEN ERFAHRUNG." By *R. Willy.*

A. Riehl discusses in the second instalment of his "Contributions to Logic" the forms of judgment and the different kinds of conclusion. B. Seligkowitz concludes his article on Ernst Platner's relation to Kant, setting forth the former's criticism of the latter's views of synthetic judgments *a priori*, his moral theology, his psychological ideas, and moral philosophy. G. Frege explains his view of 'concept and object" with reference to the idea of Benno Kerry, who does not recognise between the two any absolute difference. (Leipsic: Reisland.) *κρς.*

PHILOSOPHISCHE MONATSHEFTE. Vol. XXVIII. Nos. 3 and 4.

CONTENTS: April, 1892. No. 3.

DIE WIRKLICHKEIT ALS PHÄNOMEN DES GEISTES. By *A. Rosinski.*
RECENSIONEN.
LITTERATURBERICHT.

CONTENTS: May, 1892. No. 4.

UEBER DAS ABSOLUTE GEHÖR. By *J. v. Kries.*
DIE ZWEITEN PURKINJESCHEN BILDER IM SCHEMATISCHEN UND IM WIRKLICHEN AUGE. By *L. Matthiessen.*
BESPRECHUNGEN.
LITTERATURBERICHT.

Adolf Rosinski describes reality as a phenomenon of the mind and, following Quäbicker, he regards "the real as belonging to that complex which is given us in appearance. Being *(Wesen)* is not behind or beyond appearance; Being, being that which exists, existence is appearance. Appearance shows nothing but that which is in Being, and there is in Being nothing which is not manifested." (Berlin: Dr. R. Salinger.)

There are but few musicians who are able to recognise directly and without reference to another note, the pitch of a sound. This ability is called by musicians "absolutes Gehör." Professor Kries investigates in a long article, the conditions of this absolute musical ear so called, exhibiting the difficulties of an explanation without arriving at a definite result, which, however, may be expected from further investigations of the subject. Mr. Matthiessen's article on the second Perkinje-pictures, in the ideal and the real eye, consists exclusively of measurements and calculations of the curvature of the lens. The same number contains an appreciative and long (37 pp.) review of Prof. W. James's "Principles of Psychology." (Hamburg and Leipsic: Leopold Voss.) κρς.

THE AMERICAN JOURNAL OF PSYCHOLOGY. April, 1892. Vol. IV. No. 3.

ON CERTAIN PECULIARITIES OF THE KNEE-JERK IN SLEEP IN A CASE OF TERMINAL DEMENTIA. By *William Noyes*, M. D.
THE GROWTH OF MEMORY IN SCHOOL CHILDREN. By *T. L. Bolton*, A. B.
STUDIES FROM THE LABORATORY OF EXPERIMENTAL PSYCHOLOGY OF THE UNIVERSITY OF WISCONSIN. By Prof. *Joseph Jastrow*, Ph. D.
THE PSYCHOLOGICAL FOUNDATION OF REALISM. By *Alexander Fraser*, A. B.
PSYCHOLOGICAL LITERATURE: I. Nervous System. By Prof. *H. H. Donaldson*, Clark University; II. Association, Reaction. By Prof. *J. McK. Cattell*, Columbia College; III. Hypnotism and Suggestion. By Prof. *Joseph Jastrow*, University of Wisconsin; IV. Sight.
LETTERS AND NOTES.

Dr. Noyes's investigations seem to corroborate the theory that not only the lower but also "the higher activities of the brain are also subject to a rhythmic rise and fall synchronous with vascular dilatation and contraction." Mr. Bolton publishes the results of his examination of the span of memory in the Grammar Schools of Worcester, Mass. The memory span measuring the power of concentrated and pro-

longed attention, increases with age rather than with the growth of intelligence. The girls have better memories than the boys. Memory can be increased by practice. The tests made before and after school do not show that the pupils suffer fatigue from the day's work. Memory-images before they are completely lost first suffer a confusion of order, then a loss of certain of its elements which are often replaced by similar elements. Previous ideas being one of the factors of confusion. Professor Jastrow's article presents a description of a series of experiments made in his psychological laboratory. He reproduces the Zöllner figures, briefly summarising their different interpretations by Zöllner, Hering, Aubert, Classen, Lipps, Hoppe, Wundt, Pisco, and Helmholtz. He further presents a study of involuntary movements of the hand on the glass plate apparatus, and describes the experiments of time measurement in classifying ideas, and in finding a given object within a given field. Mr. Fraser defends the Natural Realism of the Scotch school, making the tactumotor sense the ultimate test of reality. (Worcester, Mass.: Clark University.) κρς.

REVUE PHILOSOPHIQUE.

CONTENTS: April, 1892. No. 196.

LES PROCESSUS NERVEUX DANS L'ATTENTION ET LA VOLITION. By *Charlton Bastian.*

LA RESPONSABILITÉ. By *F. Paulhan.*

REVUE GÉNÉRALE: LE SPIRITISME CONTEMPORAIN. By *Janet* (*Pierre*).

ANALYSES ET COMPTES RENDUS: Der Positivismus vom Tode August Comte's bis auf unsere Tage. By *H. Gruber.* Die Psychologie der Suggestion. By *H. Schmidkunz.*

TRAVAUX DU LABORATOIRE DE PSYCHOLOGIE PHYSIOLOGIQUE: Etude expérimentale sur deux cas d'audition colorée. By *Beaunis and Binet.* Etude sur un nouveau cas d'audition colorée. By *Binet and Philippe.*

CONTENTS: May, 1892. No. 197.

DU SENS DE L'INÉGALITÉ. By *G. Mauret.*

LA RESPONSABILITÉ (concluded). By *F. Paulhan.*

LE PROBLÈME DE LA VIE (third and last article). By *Dunan.*

ANALYSES ET COMPTES RENDUS: Leçons cliniques sur l'hystérie et l'hypnotisme By *Pitres.* Corps et âme. Essais sur la philosophie de St. Thomas. By *J. Gardair.* Agnosticisme. By *E. de Roberty.* La physique de Straton de Lampsaque. By *Rodier.* Das Wahrnehmungs-Problem vom Standpunkte des Physikers, des Physiologen und des Philosophen. By *H. Schwarz.*

REVUE DES PÉRIODIQUES ÉTRANGERS: Vierteljahrsschrift für wissenschaftliche Philosophie.

CORRESPONDANCE ET INFORMATIONS.

The processes of attention and volition lie at the basis of all our mental and physical activities. Mr. Charlton Bastian discusses their nervous condition and comes to the conclusion *Voluntas et intellectus unum et idem sunt.* M. Paulhan treats the problem of responsibility under healthy and morbid conditions, in two consecutive articles. M. Mouret, whose former articles on relations will be reviewed in a future number by Mr. F. C. Russell, treats in a long article of the sense of inequality. M. Ch. Dunan concludes his essay on the problem of life, viewing the subject from a rather metaphysical standpoint. M. Pierre Janet presents us with

a very accurate review of the importance of the contemporary spiritism and spiritualism. He calls attention to the fact that modern psychology owes to the researches of the spiritualists, many new, startling, and interesting facts. He does not share their standpoint, yet his review is kind and sympathetic. (Paris: Félix Alcan.) κρς.

VOPROSUI FILOSOFII I PSICHOLOGII.* Vol. III. No. 12. March, 1892.

POSITIVE PHILOSOPHY AND THE UNITY OF SCIENCE. (Continuation). By *B. N. Tchitcherin.* Article crowned by the Psychological Society of Moscow.

HOW DOES THE MINISTRATION TO THE GENERAL GOOD OF ALL RELATE TO THE CARE FOR THE SALVATION OF OUR OWN SOUL? A letter to the Editor. By the *Archimandrite Antonii.*

HUXLEY AS REPRESENTATIVE OF THE MODERN SCIENTIFIC THEORY OF THE WORLD.

TELEPATHY. (Concluded.) By *Petrovo-Solovo.*

THE BASIS OF ETHICAL OBLIGATION. By *N. Grote.*

SPECIAL DEPARTMENT. About Ethical Fragments from Democritus. By *J. Radloff.* One of the Possible Cosmic Theories. A Study. By *A. Wilkins.*

CRITICISM AND BIBLIOGRAPHY. I. Review of Periodicals. II. Review of Recent Publications. Transactions of the Moscow Psychological Society. (Moscow, 1892.)

MIND. New Series. No. 2. April, 1892.

PLEASURE AND PAIN. By *A. Bain.*

THE CHANGES OF METHOD IN HEGEL'S DIALECTIC. II. By *J. Ellis McTaggart*

THE LEIPSIC SCHOOL OF EXPERIMENTAL PSYCHOLOGY. By *E. Bradford Titchener.*

THE LOGICAL CALCULUS. II. By *W. E. Johnson.*

DISCUSSIONS: Dr. Münsterberg and his Critics. By *S. Alexander.*

CRITICAL NOTICES.

Prof. A. Bain criticises Mr. H. R. Marshall's theory of pleasure and pain as being determined by the relation between the energy given out and the energy received, saying that it leaves a very large region untouched and inexplicable. J. Ellis McTaggart defends the Hegelian dialectic system which, he declares, "is not so wonderful or mystic as it has been represented to be. It makes no attempt,' he says, "to deduce existence from essence; it does not even attempt to eliminate the element of immediacy, in experience, and to produce a self-sufficient and self-mediating thought." E. Bradford Titchener gives a general survey of the researches carried out in Wundt's Institute, and of the other psychological contents of the *Philosophische Studien*, from the date of Professor Cattell's paper on "The Psychological Laboratory at Leipsic" to the present time. W. E. Johnson, in his paper on "The Logical Calculus," brings out some of the underlying principles and assumptions which belong equally to the ordinary Formal Logic, to Symbolic Logic, and to the so-called Logic of Relatives. Prof. S. Alexander takes issue with Mr. Titchener's criticism of Professor Münsterberg's psychological investigations. Mr. Titchener's article which appeared in the October number of *Mind*, 1891, leaves the

* *Questions of Philosophy and Psychology.*

impression that the whole of the work under review is valueless. "Many of his objections," however, says Professor Alexander, "refer to unimportant points, and the graver theoretical ones are really groundless," and thus the critic "has contrived to give a one-sided judgment by neglecting the other considerations which give Dr. Münsterberg's work its value and significance." (London: Williams & Norgate.) κρς.

THREE AMERICAN MAGAZINES.

INTERNATIONAL JOURNAL OF ETHICS. April, 1892. Vol. II. No. 3.

ECONOMIC REFORM SHORT OF SOCIALISM. By *E. Benj. Andrews.*
PLEASURE AND PAIN IN EDUCATION. By *Miss M. S. Gilliland*, London.
THE ESSENTIALS OF BUDDHIST DOCTRINE AND ETHICS. By Prof. *Maurice Bloomfield.*
THE THREE RELIGIONS. (Concluded.) By *J. S. Mackenzie*, M. A.
DISCUSSIONS AND REVIEWS.
THE SCHOOL OF APPLIED ETHICS.

THE PHILOSOPHICAL REVIEW. Vol. I. No. 3. May, 1892.

HERBERT SPENCER'S ANIMAL ETHICS. By Prof. *Henry Calderwood.*
THE ULTIMATE GROUND OF AUTHORITY. By Prof. *J. Macbride Sterrett.*
WHAT IS REALITY? By *David G. Ritchie.*
NATURAL SCIENCE AND THE PHILOSOPHY OF NATURE. By Dr. *B. C. Burt.*
A MATHEMATICAL VIEW OF FREE WILL. By Prof. *J. E. Oliver.*
DISCUSSIONS: Professor Ladd's Criticism of James's Psychology. By Prof. *J. P. Gordy.*
REVIEWS OF BOOKS AND SUMMARIES OF ARTICLES.

THE NEW WORLD. Vol. I. No. 1. March, 1892.

THE EVOLUTION OF CHRISTIANITY. By *Lyman Abbott.*
THE HISTORIC AND THE IDEAL CHRIST. By *Charles Carroll Everett.*
THE FUTURE OF LIBERAL RELIGION IN AMERICA. By *J. G. Schurman.*
THE COMMON, THE COMMONPLACE AND THE ROMANTIC. By *William Rounseville Alger.*
ABRAHAM KUENEN. By *Crawford Howell Toy.*
THE THEISTIC EVOLUTION OF BUDDHISM. By *J. Estlin Carpenter.*
"BETWEEN THE TESTAMENTS." By *Thomas R. Slicer.*
THE NEW ORTHODOXY. By *Edward H. Hall.*
THEOLOGICAL ASPECTS OF THE PHILOSOPHY OF THOMAS HILL GREEN. By *Charles B. Upton.*
INTRODUCTORY NOTE.
BOOK REVIEWS.

There have sprung up within the last two years not less than four American magazines of progressive thought, which now compete in the proposition of their religious and philosophical conceptions to the world. These four magazines are, in the chronological order in which they were founded, *The Monist*, *The International Journal of Ethics*, *The Philosophical Review*, and *The New World*. *The Monist* represents that world-conception which takes its stand upon facts and systematises facts into a unitary view. Thus it recognises the methods of science as the methods

of all knowledge, to the exclusion of supernatural revelation, or intuitionalism, or any kind of mysticism. But *The Monist* does not rest satisfied with this. *The Monist* preaches a religion; and the prophets of this religion are not only the great ethical teachers of mankind, but everybody who reveals truth, Kant and Comte, Kepler, Copernicus, Darwin, and all living representatives of scientific inquiry. Thus *The Monist* is a magazine that points out the religious import of science and philosophy.

The International Journal of Ethics follows in the same line in so far only as it has nothing to say to the old orthodox conceptions of religion. It tries to teach a higher morality, but in establishing ethics it pursues quite another course. It is the organ of the Ethical Societies and the leaders of the Ethical Societies are confident that they can have ethics not only without theology but also without religion, science, or philosophy. They consider the world-conception of a man as something indifferent, or unessential, in ethics, and by proposing a non-committal policy with respect to religious and philosophical views, they expect to be the better fitted to preach good conduct. (Philadelphia: *International Journal of Ethics*, 118 S. Twelfth Street.)

The Philosophical Review represents a philosophical conception which has still a strong hold upon the Universities on this side of the Atlantic. Transcendentalism, metaphysicism, and that theological philosophy which still operates with supernatural quantities, or at least has not discarded the dualistic features of supernaturalism, are represented in its columns. Certainly they are well represented and by their best upholders of the present time, and authors of more modern and positivistic views are not excluded. Exactly so in *The Monist*, the representatives of metaphysicism and those who still believe in the dual existence of man, in his self, or ego, and his transcendental existence are welcome; but there is nevertheless a fundamental difference in the world-conception of the two magazines. (Boston, New York, Chicago: Ginn & Co.)

The New World is the latest new-comer in the field of magazine literature, and we welcome its appearance most cordially. There are strongly marked differences between *The New World* and *The Monist*, for the former is a theological magazine that deepens religion with the assistance of philosophy while the latter, rather the reverse, is a philosophical magazine that widens philosophy and applies it to practical life so as to become a religion. But for that very reason *The New World* seems to meet *The Monist* half way. *The New World* is an offshoot of modern theology. Its contributors come largely from the ranks of the maturest unitarian thinkers. They practically accept the principles of criticism and scientific inquiry and thus they are approaching rapidly that common goal of human thought, which *The Monist* propounds as the leading maxim of philosophy and religion, namely, to regard nature as the only revelation and experience as our guide in life; to base religion upon and to derive ethics from a critically-sifted statement of facts. (Boston: Houghton, Mifflin & Co.) KOS.

APPENDIX TO THE MONIST, VOL. II, NO. 4

KANT AND SPENCER

TWO ARTICLES REPRINTED FROM NOS. 51, 52, AND 158
OF THE OPEN COURT

1. THE ETHICS OF KANT
2. KANT ON EVOLUTION

BY
DR. PAUL CARUS

CHICAGO:
THE OPEN COURT PUBLISHING COMPANY

THE ETHICS OF KANT.

IN CRITICISM OF MR. HERBERT SPENCER'S PRESENTATION OF KANTISM.

MR. Herbert Spencer has published in *The Popular Science Monthly* for August, an essay on the Ethics of Kant; a translation of this article had appeared in the July Number of the *Revue Philosophique*, and it cannot fail to have been widely noticed. It is to be regretted that unfamiliarity with the German language and perhaps also with Kant's terminology has led Mr. Spencer into errors to which attention is called in the following discussion.*

Mr. Spencer says:

"If, before Kant uttered that often-quoted saying in which, "with the stars of Heaven he coupled the conscience of Man, as "being the two things that excited his awe, he had known more of "Man than he did, he would probably have expressed himself some-"what otherwise."

Kant, in his famous dictum that two things excited his admiration, the starry heaven above him and the conscience within him, contrasted two kinds of sublimity.† The grandeur of the Universe is that of size and extension, while the conscience of man commands respect for its moral dignity. The universe is wonderful in its expanse and in its order of mechanical

* Quotations from Mr. Spencer's essay will be distinguished by quotation-marks, while those from Kant will appear in hanging indentations.

† Kant distinguishes two kinds of sublimity: 1) the mathematical, and 2) the dynamical. His definitions are: 1) sublime is that in comparison with which everything else is small; and 2) sublime is that the mere ability to conceive which shows a power of emotion (Gemüth), the latter transcending any measurement by the senses. [1) Erhaben ist, mit welchem im Vergleich alles andere klein ist. 2) Erhaben ist, was auch nur denken zu können ein Vermögen des Gemüths beweist, das jeden Maasstab der Sinne übertrifft. Editio Hartenstein, Vol. V, pp. 257, 258.]

regularity; the conscience of man is grand, being intelligent volition that aspires to be in harmony with universal laws.

Mr. Spencer continues:

"Not, indeed, that the conscience of Man is not wonderful "enough, whatever be its supposed genesis; but the wonderfulness "of it is of a different kind according as we assume it to have been "supernaturally given or infer that it has been naturally evolved. "The knowledge of Man in that large sense which Anthropology "expresses, had made, in Kant's day, but small advances. The "books of travel were relatively few, and the facts which they con- "tained concerning the human mind as existing in different races, "had not been gathered together and generalized. In our days, the "conscience of Man as inductively known has none of that univer- "sality of presence and unity of nature which Kant's saying tacitly "assumes."

Mr. Spencer apparently supposes that Kant believed in a supernatural origin of the human conscience. This, however, is erroneous.

Mr. Spencer's error is excusable in consideration of the fact that some disciples of Kant have fallen into a similar error. Professor Adler, of New York, who attempts in the Societies for Ethical Culture to carry into effect the ethics of Pure Reason, maintains that the commandments of the *ought* and "the light that shines through them come from beyond, but its beams are broken as they pass through our terrestrial medium, and the full light in all its glory we can never see."

Ethics based on an unknowable power, is mysticism; and mysticism does not essentially differ from dualism and supernaturalism.

Kant's reasoning is far from mysticism and from supernaturalism. He was fully convinced that civilized man with his moral and intellectual abilities

had naturally evolved from the lower state of an animal existence. We read in his essay, "Presumable Origin of the History of Mankind" (Muthmasslicher Anfang der Menschengeschichte. Editio Hartenstein, Vol. IV, p. 321):

> "From this conception of the primitive history of mankind it follows that the departure of man from the paradise represented to him by his reason as the earliest place of sojourn of his race, has been nothing else than the transition from the rude condition of a purely animal existence to the condition of a human being; a transition from the leading-strings of instinct to direction by reason, in a word, from the protectorate of nature to a status of freedom."

The view that the conscience of man is innate, in the sense of a non-natural, of a mysterious, or even of a supernatural origin, is untenable. Those disciples of Kant who entertain such views have certainly misinterpreted their great master, and the passages adduced by Mr. Spencer from so many sources are sufficient evidence of the fact that "there are widely different degrees" [we should rather say kinds] "of conscience in the different races." Mr. Spencer continues:

> "Had Kant had these and kindred facts before him, his conception of the human mind, and consequently his ethical conception, would scarcely have been what they were. Believing, as he did, that one object of his awe—the stellar Universe—has been evolved,* he might by evidence like the foregoing have been led to suspect that the other object of his awe—the human conscience—has been evolved; and has consequently a real nature unlike its apparent nature." * * * "If, instead of assuming that conscience is simple because it seems simple to careless introspection he had entertained the hypothesis that it is perhaps complex—a consolidated product of multitudinous experiences received mainly by ancestors and added to by self—he might have arrived at a consistent system of Ethics." * * *

* The stellar Universe, of course, has not been evolved; Mr. Spencer means that according to Kant's mechanical explanation the planetary systems and milky ways of the stellar Universe are in a state of constant evolution.

"In brief, as already implied, had Kant, instead of his incon-
"gruous beliefs that the celestial bodies have had an evolutionary
"origin, but that the minds of living beings on them, or at least on
"one of them, have had a non-evolutionary origin, entertained the
"belief that both have arisen by Evolution, he would have been
"saved from the impossibilities of his Metaphysics, and the untena-
"bilities of his Ethics."

Mr. Spencer believes that Kant had assumed conscience to be "simple, because it seems simple to careless introspection." But there is no evidence in Kant's works for this assumption. On the contrary, Kant reversed the old view of so-called "rational psychology" which considered conscience as innate and which was based on the error that consciousness is simple. Des Cartes's syllogism *cogito ergo sum* is based on this idea, which at the same time served as a philosophical evidence for the indestructibility and immortality of the *ego*. The simplicity of consciousness had been considered as an axiom, until Kant came and showed that it was a fallacy, a paralogism of pure reason. Dr. Noah Porter has written, from an apparently dualistic standpoint, a sketch entitled "The Ethics of Kant," in which he says:

"The skepticism and denials of Kant's speculative theory in respect to noumena, both material and psychical, had unfortunately cut him off from the possibility of recognizing the personal *ego* as anything more than a logical fiction."

Kant says in his "Critique of Pure Reason": *

"In the internal intuition there is nothing permanent, for the *Ego* is but the consciousness of my thought. * * * From all this it is evident that rational psychology has its origin in a mere misunderstanding. The unity of consciousness, which lies at the basis of the categories, is considered to be an intuition of the subject as an object; and the category of substance is applied to the intuition. But this unity is nothing more than

* Translation by J. M. D. Meiklejohn, pp. 244, 249.

the unity in *thought*, by which no object is given; to which therefore the category of substance cannot be applied."*

Concerning the statement that Kant had believed in the non-evolutionary origin of living beings, we quote from his essay on *The Different Races of Men*, Chap. III, where Kant speaks of "the immediate causes of the origin of these different races." He says:

"The conditions (*Gründe*) which, inhering in the constitution of an organic body, determine a certain evolutionary process (*Auswickelung*†) are called, if this process is concerned with particular parts, *germs*; if, on the other hand, it touches only the size or the relation of the parts to one another, I call it *natural capabilities* (*natürliche Anlagen*)."‡

And in a foot-note Kant makes the following remark:

"Ordinarily we accept the terms natural science (*Naturbeschreibung*) and natural history in one and the same sense. But it is evident that the knowledge of natural phenomena, as they *now are*, always leaves to be desired the knowledge of that which they *have been* before now and through what succession of modifications they have passed in order to have arrived, in every respect, to their present state. *Natural History*, which at present we almost entirely lack, would teach us the changes that have affected the form of the earth, likewise, the changes in the creatures of the earth (plants and animals), that they have suffered by natural transformations and, arising therefrom, the departures from the prototype of the original species, that they have experienced. It would probably trace a great number of apparently different varieties back to species of one and the same kind and would

* Compare also Kant's "Prol. zu jeder künftigen Metaphysik," § 46.

† We call attention to Kant's peculiar expression, in this passage, of *Auswickelung* which has now yielded to the term *Entwickelung*.

‡ Die in der Natur eines organischen Körpers (Gewächses oder Thieres) liegenden Gründe einer bestimmten Auswickelung heissen, wenn diese Auswickelung besondere Theile betrifft, *Keime*; betrifft sie aber nur die Grösse oder das Verhältniss der Theile unter einander, so nenne ich sie *natürliche Anlagen*.

convert the present so intricate school-system of Natural Science into a natural system in conformity with reason." *

Kant has nowhere, so far as we know, made any objection to the idea of evolution. But he opposed the theory that all life should have originated from *one single* kind. In reviewing and epitomizing Joh. Gottfr. Herder's work, "*Ideen zur Geschichte der Menschheit*," Kant says:

* * * "Book II, treats of organized matter on the earth. * * * The beginnings of vegetation. * * * The changes suffered by man and beast through climatic influences. * * * In them all we find one prevailing form and a similar osseous structure. * * * These transitional links render it not at all impossible that in marine animals, in plants, and, indeed, possibly in so-called inanimate substances, one and the same fundamental principle of organization may prevail, although infinitely cruder and more complex in operation. In the sight of eternal being, which beholds all things in one connection, it is possible that the structure of the ice-particle, while receiving form, and of the snowflake, while being crystallized, bears an analogous relation to the formation of the embryo in a mother's womb. * * * The third book compares the structure of animals and plants with the organization of man. * * * It was not because man was ordained to be a rational creature that upright stature was given him for using his limbs according to reason; on the contrary he acquired his reason as a consequence of his upright stature. * * * From stone to crystals, from crystals to metals, from metals

* Wir nehmen die Benennungen *Naturbeschreibung* und *Naturgeschichte* gemeiniglich in einerlei Sinne. Allein es ist klar, dass die Kenntniss der Naturdinge, wie sie *jetzt sind*, immer noch die Erkenntniss von demjenigen wünschen lasse, was sie ehedem *gewesen* sind und durch welche Reihe von Veränderungen sie durchgegangen, um an jedem Ort in ihren gegenwärtigen Zustand zu gelangen. Die *Naturgeschichte*, woran es uns noch fast gänzlich fehlt, würde uns die Veränderung der Erdgestalt, imgleichen die der Erdgeschöpfe (Pflanzen und Thiere), die sie durch natürliche Wanderungen (sic! I take it as a misprint for *Wandelungen*) erlitten haben, und ihre daraus entsprungenen Abartungen von dem Urbilde der Stammgattung lehren. Sie würde vermuthlich eine grosse Menge scheinbar verschiedener Arten zu Racen ebenderselben Gattung zurückführen, und das jetzt so weitläuftigte Schulsystem der Naturbeschreibung in ein physisches System für den Verstand verwandeln.

to plant-creation, from thence to the animal, and ultimately to man, we have seen the form of organization advancing, and with it the faculties and instincts of creatures becoming more diversified, until at last they all became united in the human form, in so far as the latter could comprise them. * * * As the body increases by food, so does the mind by ideas; indeed, we notice here the same laws of assimilation, of growth, and of generation. In a word, an inner spiritual man is being formed within us, which has a nature of its own and which employs the body as an instrument merely. * * * Our humanity is merely a preliminary training, the bud of a blossom to come. Step by step does nature cast off the ignoble and the base, while it builds and adds to the spiritual and continues to fashion the pure and refined with increasing niceness; thus are we in a position to hope from the artist-hand of nature that in that other existence our bud of humanity will also appear in its real and true form of divine manhood." * * *

[Herder's idea of evolution would stand on the whole if his conception of "the spiritual" did not imply a preternatural agent.]

"The present state of man is probably the link of junction between two worlds. * * * Yet man is not to investigate himself in this future state; he is to believe himself into it."

Kant makes no objection whatever to the evolutionary ideas of Herder. But Herder was not free from supernaturalism and from fantastic ideas in reference to the future development of man. He had not yet dropped the dualistic conception of the 'duplicity' of man and believed in the immortality of a distinct spiritual individual within his body. Kant's objection, therefore, is twofold; 1) against Herder's supernaturalism which leads him beyond this world; and, 2) against the descent of *all* species from *one and and the same genus*. He says:

"In the gradation between the different species and individuals of a natural kingdom, nature shows us nothing else

than the fact that it abandons individuals to total destruction and preserves the species alone. * * * As concerns that *invisible* kingdom of active and independent forces, we fail to see why the author, after having believed he could confidently infer from organized beings, the existence of the rational principle in man did not rather attribute this principle directly to him merely as spiritual nature, instead of lifting it out of chaos through the structural form of organized matter. * * * As to the gradation of organized beings, our author is not to be too severely reproached, if the scheme has not met the requirements of his conception, which extends so far beyond the limits of this world; for its application even to the natural kingdoms here on earth leads to nothing. The slight differences exhibited when species are compared with reference to their common points of resemblance, are, where there is such great multiplicity, a necessary consequence of just this multiplicity. The assumption of common kinship between them, inasmuch as one kind would have to spring from another and all from one original and primitive species, or from one and the same creative source (Mutterschoss)—the assumption of such a common kinship would lead to ideas so strange that reason shrinks from them, and we cannot attribute this idea to the author without doing him injustice. Concerning his suggestions in comparative anatomy through all species down to plants, the workers in natural science must judge for themselves whether the hints given for new observations, will be useful and whether they are justified. * * * It is desirable that our ingenious author who in the continuation of his work will find more *terra firma*, may somewhat restrain his bright genius, and that philosophy (which consists rather in pruning than in fostering luxuriant growth) may lead him to the perfection of his labors not through hints but through definite conceptions, not by imagination but by observation, not by a metaphysical or emotional phantasy but by reason, broad in its plan but careful in its work."

Kant rejected certain conceptions of evolution, but he did not at all show himself averse to the idea in general. He touched upon the subject only incidentally and it is certain that he did not especially favor

or entertain the belief in a non-evolutionary origin of living beings.

Before proceeding to the main points of his criticism, Mr. Spencer calls attention to what he designates as Kant's *abnormal* reasoning. Mr. Spencer says:

"Something must be said concerning abnormal reasoning as "compared with normal reasoning." * * *

"Instead of setting out with a proposition of which the nega- "tion is inconceivable, it sets out with a proposition of which the "affirmation is inconceivable, and therefrom proceeds to draw con- "clusions." * * *

"The first sentence in Kant's first chapter runs thus: 'Noth- "ing can possibly be conceived in the world, or even out of it, "which can be called good without qualification, except a Good "Will.'" * * *

"Most fallacies result from the habit of using words without "fully rendering them into thoughts—passing them by with recog- "nitions of their meanings as ordinarily used, without stopping to "consider whether these meanings admit of being given to them in "the cases named. Let us not rest satisfied with thinking vaguely "of what is understood by 'a Good Will,' but let us interpret the "words definitely. Will implies the consciousness of some end to "be achieved. Exclude from it every idea of purpose, and the con- "ception of Will disappears. An end of some kind being necessa- "rily implied by the conception of Will, the quality of the Will is "determined by the quality of the end contemplated. Will itself, "considered apart from any distinguishing epithet, is not cognizable "by Morality at all. It becomes cognizable by Morality only when "it gains its character as good or bad by virtue of its contemplated "end as good or bad." * * *

"Kant tells us that a good will is one that is good in and for "itself without reference to ends."

It is unfortunate that Mr. Spencer misunderstood the first sentence of Kant's book (*Grundlegung zur Metaphysik der Sitten*). Kant does not speak of "a good will without qualification," nor does the expression "without qualification" refer to "a will without reference to ends." Kant speaks of good will in

opposition to other good things. Nothing, he says, can without qualification (*ohne Einschränkung*) be called good, except a good will.* Dr. Porter sums up the first page of Kant's essay in the following words:

"The first section of the treatise opens with the memorable and often-quoted utterance, that 'nothing can be possibly conceived in the world, or even out of it, which can be called good without qualification, except a good will.' If character is compared with gifts of nature, as intelligence, courage, and gifts of fortune, as riches, health, or contentment, all these are defective, 'if there is not a good will to correct their possible perversion and to rectify the whole principle of acting, and *adapt it to its end.*' † A man who is endowed with every other good can never give pleasure to an impartial, rational spectator unless he possesses a good will. 'Thus a good will appears to constitute the indispensable condition of being worthy of happiness.' * * * 'Moreover, a good will is good not for what it effects but for what it intends, even when it fails to accomplish its purposes, * * * as when the man wills the good of another and is impotent to promote it, or actually effects just the opposite of what he proposes or wills.'"

In the passages quoted by Dr. Porter, Kant speaks of "the *end* to which good will adapts other goods"; and in another passage of the same book, Kant directly declares that "it is the *end* that serves the will as the objective ground of its self-determination." Mr. Spencer must have overlooked these sentences. Kant says:

"The will is conceived as a power of determining itself to action in accordance with the conception of certain laws. And such a power can only be met with in rational beings. *Now it is the END that serves the will as the objective ground of its self-determination*, and this end, if fixed by reason alone, must hold equally good for all rational creatures."

* * *

Mr. Spencer interrupts his essay on the Ethics of

* The original of the first sentence reads: "Es ist überall nichts in der Welt, ja überhaupt auch ausser derselben zu denken möglich, was ohne Einschränkung für gut könnte gehalten werden, als allein ein guter Wille."

† *Italics are ours.*

Kant by a digression on Kant's conception of time and space. It would lead us too far at present if we would follow Mr. Spencer on this ground also. A comparison of Spencer's remarks on the subject with Kant's "Critique of Pure Reason" will show that Kant's view of space and time is radically different from that view which Mr. Spencer represents as the Kantian conception of time and space.

* * *

Kant rejects the idea that happiness is the end and purpose of life and at the same time he declares that ethics must be based not on the pursuit of happiness but on the categorical imperative or more popularly expressed on our sense of duty.

Mr. Spencer argues:

"One of the propositions contained in Kant's first chapter is "that 'we find that the more a cultivated reason applies itself with "deliberate purpose to the enjoyment of life and happiness, so "much the more does the man fail of true satisfaction.'" * * *

"That which Kant should have said is that the *exclusive* pur- "suit of what are distinguished as pleasures and amusements is dis- "appointing." * * *

"It is not, as Kant says, guidance by 'a cultivated reason,' "which leads to disappointment, but guidance by an uncultivated "reason."

The passage quoted by Mr. Spencer from Kant, reads in its context as follows:

"In the physical constitution of an organized being we take it for granted* that no organ for any purpose will be found in it but

*The phrase "we take it for granted" (in the original "nehmen wir es als Grundsatz an)" reads in the translation quoted by Mr. Spencer: "we take it as a fundamental principle." Mr. Spencer objects to the passage declaring that there *are* many organs (such as rudimentary organs) in the construction of organized beings which serve *no* purpose. This however does not stand in contradiction to Kant's assumption that organs of organized beings serve a special purpose. The rudimentary organs have under other conditions served a purpose for which they then were fit and well adapted and are disappearing now because no longer used.

such as is also the fittest and best adapted for that purpose. If in a being possessing reason and will, the preservation, the prosperity, in a word, the happiness of that being, constituted the actual purpose of nature, nature had certainly adopted an extremely unwise expedient to this end, had it made the reason of that being the executive agent of its purposes in this matter. For all actions that it had to perform with this end in view, and the whole rule of its conduct, would have been far more exactly prescribed by *instinct*, and this end would have been far more safely attained by this means than can ever take place through the instrumentality of *reason*." * * *

"As a matter of fact we find that the more a cultivated reason occupies itself with the purpose of enjoying life and happiness, the farther does the person possessing it recede from the state of true contentment; and hence there arises in the case of many, and pre-eminently in the case of those most experienced in the exercise of reason, if they are only frank enough to confess it, a certain degree of misology or hate of reason; for after weighing every advantage that they derive, I will not say from the invention of all arts facilitating ordinary luxury, but even from the sciences, (which after all are in their eyes a luxury of the intellect,) they still discover that virtually they have burdened themselves more with toil and trouble than they have gained in point of happiness, and thus, in the end, they are more apt to envy than contemn the commoner type of men who are more immediately subject to the guidance of natural instinct alone, and who do not suffer their reason to influence in any great degree their acts and omissions."

Kant uses the expression "cultivated reason" not in opposition to "uncultivated reason," but "to instinct" as that inherited faculty which teaches a being to live in accordance with nature and its natural conditions, without the interference of thought and reflection.

That uncultivated reason would lead to disappointment, Kant never would have denied. He would have added: "It does more, it leads to a speedy ruin."

But if reason does not produce happiness, what then is the use of reason? Kant answers, reason produces in man the good will.

It is reason which enables man to form abstractions, to think in generalizations and to conceive the import of universal laws. When his will deliberately and consciously conforms to universal laws, it is good. Kant says:

"Thus will (viz. the good will) can not be the sole and whole Good, but it must still be the highest Good and the condition necessary to everything else, even to all desire of happiness." * * *

"To know what I have to do in order that my volition be good, requires on my part no far-reaching sagacity. Unexperienced in respect of the course of nature, unable to be prepared for all the occurrences transpiring therein, I simply ask myself: Can'st thou so will, that the maxim of thy conduct may become a 'universal law? Where it can not become a universal law, there the maxim of thy conduct is reprehensible, and that, too, not by reason of any disadvantage consequent thereupon to thee or even others, but because it is not fit to enter as a principle into a possible enactment of universal laws."

If a maxim of conduct is fit to enter as a principle into a possible enactment of universal laws, it will be found in harmony with the cosmical laws; if not, it must come in conflict with the order of things in the universe. It then cannot stand, and will, if persistently adhered to, lead (perhaps slowly but inevitably) to certain ruin.

Concerning the proposition that happiness may be regarded as the purpose of life Kant in his review of Herder's "Ideen zur Philosophie der Geschichte der Menschheit" Ed. H. IV, p. 190), speaks of the relativity of happiness and its insufficiency as a final aim of life:

* * * "First of all the happiness of an animal, then that of a child and of a youth, and lastly that of man! In all epochs of human history, as well as among all classes and conditions of the same epoch, that happiness has obtained which was in exact conformity with the individual's ideas and the degree of his habituation to the conditions amid which he was born and raised. Indeed, it is not even possible to form a comparison of the degree of happiness nor to give precedence to one class of men or to one generation over another. * * * If this shadow-picture of happiness.... were the actual aim of Providence, every man would have the measure of his own happiness within him. * * * Does the author (Herder) think perhaps that, if the happy inhabitants of Otaheite had never been visited by more civilized peoples and were ordained to live in peaceful indolence for thousands of years to come—that we could give a satisfactory answer to the question why they should exist at all and whether it would not have been just as well that this island should be occupied by happy sheep and cattle as that it should be inhabited by men who are happy only through pure enjoyment?"

Concerning the mission or purpose of humanity and its ultimate realization, Kant interprets Herder's views as follows:

"It involves no contradiction to say that no individual member of all the offspring of the human race, but that only the species, fully attains its mission (Bestimmung). The mathematician may explain the matter in his way. The philosopher would say: the mission of the human race as a whole is *unceasing progress*, and the perfection (Vollendung) of this mission is a mere idea (although in every aspect a quite useful one) of the aim towards which, in conformity with the design of providence, we are to direct our endeavors."

We learn from the passages quoted from Kant that his idea of good will is neither mystical and supernatural, nor is it vague. It is a conception as logically and definitely defined as any mathematical definition. Good will in the sense in which Kant defines it, is only possible in a reasonable being by the power

of its reason. The good will is the intention of conforming to universal principles and thus of being in harmony with the All. This good will is the cornerstone of Kant's ethics; it appears as the categoric imperative of duty, so to act that the maxim of one's conduct may be fit to become a universal law. It is formulated in another passage: "Act so as if the maxim of thy conduct by thy volition were to become a natural law."

It is easily seen that, in Kant's conception, the *ought* of morals (viz. of the categoric imperative) does not stand in contradiction to the *must* of natural laws. Kant's conception is monistic, not dualistic. Kant says:

"The moral *ought* is man's *inner, necessary* volition as being a member of an intelligible world and is *conceived* by him as an ought only in so far as he considers himself also as a member of the sensory world."*

Our way of explaining it would be: Man *feels* in his activity the categoric imperative as an ought. So the snow crystal, if it were possessed of sensation, would *feel* its formation as an "ought." But both are, and to an outside observer will appear, as a "must."

* * *

In the Spencerian system of ethics, which is utilitarianism, the moral maxim or the idea of duty is not distinguished from the feeling of pleasure or pain that accompanies ethical thoughts and acts, and their consequences. This lack of distinction induces Mr. Spencer to consider man's pursuit of happiness as the basis of ethics. Accordingly the aim of ethics, he

* Das moralische Sollen ist also ein eigenes nothwendiges Wollen als Gliedes einer intelligiblen Welt, und wird nur sofern von ihm als Sollen gedacht, als er sich zugleich wie ein Glied der Sinnenwelt betrachtet. Ed. Hartenstein vol IV. p. 303.

maintains, is not the performance of duty, not the realization of the good; to the utilitarian this is only the means. The end of ethics is the greatest happiness of the greatest number.

It is strange that Mr. Spencer's essay contains a passage which, although intended as a point of objection to Kant, is a corroboration of Kant's ethics, and a refutation of Mr. Spencer's own views. While denying the statement that "a cultivated reason, if applied with deliberate purpose to the enjoyment of life and happiness, will fail to produce true satisfaction," Mr. Spencer says:

> "I assert that it is untrue on the strength of personal experiences. In the course of my life there have occurred many intervals, averaging a month each, in which the pursuit of happiness was the sole object, and in which happiness was successfully pursued. How successfully may be judged from the fact that I would gladly live over again each of those periods without change, an assertion which I certainly cannot make of any portions of my life spent in the daily discharge of duties."

This statement, if it proves anything, proves that happiness is one thing and duty is another; it proves that Kant's theory of ethics, which is based on the discharge of duty and not on the pursuit of happiness, is correct, and that Mr. Spencer's theory which identifies duty with the pursuit of happiness, is wrong.

However, we must in this place express our opinion that Mr. Spencer's statement *cannot* be quite correct. The discharge of duty, unpleasant though the drudgery part of it may have been, was undoubtedly accompanied and followed by a certain satisfaction, which perhaps was less in quantity, but certainly higher in quality than the pleasure derived from the mere pursuit of happiness. And in the valuation of the intrinsic and of the moral worth of pleasures, the

quality alone should be taken into consideration, not the quantity. In this sense only can an ethical hedonism or utilitarianism be acceptable. The man whose pleasures and pains are of a higher kind, of a nobler form, and of a better quality, is morally and generally the more evolved man. And then, the basis of ethics would be, not so much pleasure or happiness as the quality of pleasure or happiness; it would be an aspiration to evolve toward a higher plane of life, to shape our lives in nobler forms, and to enjoy nobler, greater, and more spiritual pleasures, or, as Kant says, "unceasing progress."

Mr. Spencer's assertion, if taken in the sense in which it stands, is a contradiction of his ethical theory. But even if Mr. Spencer had declared that the discharge of duty affords a kind of happiness or satisfaction, as it truly does, there would still remain a deep gap between his and Kant's ethics. Mr. Spencer reduces ethics to mere worldly prudence; he says that we must do the good in order to be happy, and for the sake of its utility, and Kant says we must act so as to be in agreement with universal law. Mr. Spencer says:

"But now, supposing we accept Kant's statement in full, "what is its implication? That happiness is the thing to be "desired, and, in one way or another, the thing to be "achieved." * * *

"An illustration will best show how the matter stands. To a "tyro in archery the instructor says: 'Sir, you must not point "your arrow directly at the target; if you do, you will inevitably "miss it; you must aim high above the target, and you may then "possibly pierce the bull's-eye.' What now is implied by the "warning and the advice? Clearly that the purpose is to hit the "target. Otherwise there is no sense in the remark that it will "be missed if directly aimed at; and no sense in the remark that "to be hit, something higher must be aimed at. Similarly with "happiness. There is no sense in the remark that happiness will

"not be found if it is directly sought, unless happiness is a thing "to be somehow or other obtained." * * *

"So that in this professed repudiation of happiness as an end, "there lies the inavoidable implication that it *is* the end."

The pursuit of happiness is by no means repudiated by Kant as wrong or immoral; it is only maintained to be insufficient as a foundation of ethics. Kant's remark that happiness will not be found if it is directly sought has no reference to his own ethics. Kant, speaking from the standpoint of one who takes the view of utilitarianism, says that if a cultivated reason applies itself to the sole purpose of enjoying life and happiness, it will meet with a failure.*

Any other explanation of the moral *ought* than that from the Good Will, Kant declares to be *heteronomy*. Will would no longer be itself, and the principle of action would lie in something foreign to the will. Kant says:

"Will in such a case would not be a law to itself; but the object by its relation to the will would impose the law upon the will." * * * This would admit of hypothetical imperatives only: "I ought to do a certain thing, because I want something else." The moral and therefore categorical imperative, on the contrary, says: 'I ought to act so or so, even if I had nothing else in view.' For instance: the hypothetical imperative of heteronomy says: 'I ought not to lie, if I ever wish to preserve my honor.' The categorical imperative says: 'I ought not to lie even if it would not in the least bring me to shame.'"

Mr. Spencer quotes the following passage from Kant:

"I omit here all actions which are already recognized as inconsistent with duty, although they may be useful for this or that purpose, for with these the question whether they are done *from duty* can not arise at all, since they even conflict with it. I also set aside those actions which really conform to duty,

* The passage referred to is quoted in full on page 16.

but to which men have *no* direct *inclination*, performing them because they are impelled thereto by some other inclination. For in this case we can readily distinguish whether the action which agrees with duty is done *from duty*, or from a selfish view. It is much harder to make this distinction when the action accords with duty, and the subject has besides a *direct* inclination to it. For example, it is always a matter of duty that a dealer should not overcharge an inexperienced purchaser, and wherever there is much commerce the prudent tradesman does not overcharge, but keeps a fixed price for every one, so that a child buys of him as well as any other. Men are thus *honestly* served; but this is not enough to make us believe that the tradesman has so acted from duty and from principles of honesty: his own advantage required it; it is out of the question in this case to suppose that he might besides have a direct inclination in favor of the buyers, so that, as it were, from love he should give no advantage to one over another [!]. Accordingly the action was done neither from duty nor from direct inclination, but merely with a selfish view.

"On the other hand, it is a duty to maintain one's life, and, in addition, every one has also a direct inclination to do so. But on this account the often anxious care which most men take for it has no intrinsic worth, and their maxim has no moral import. They preserve their life *as duty requires*, no doubt, but not *because duty requires*. On the other hand, if adversity and hopeless sorrow have completely taken away the relish for life; if the unfortunate one, strong in mind, indignant at his fate rather than desponding or dejected, wishes for death, and yet preserves his life without loving it—not from inclination or fear, but from duty—then his maxim has a moral worth.

"To be beneficent when we can is a duty; and besides this, there are many minds so sympathetically constituted that without any other motive of vanity or self-interest, they find a pleasure in spreading joy around them, and can take delight in the satisfaction of others so far as it is their own work. But I maintain that in such a case an action of this kind, however proper, however amiable it may be, has nevertheless no true moral worth, but is on a level with other inclinations" (pp 17–19)

Kant's metaphysics of ethics is to practical ethics what pure mathematics is to applied mathematics, or what logic is to grammar. Kant's method of reasoning *in abstracto* everywhere shows the mathematical bent of his mind. In a foot-note (Editio Hartenstein, IV), p. 258, he says:

"As pure mathematics is distinguished from applied mathematics and pure logic from applied logic, so may the pure philosophy (the metaphysics) of ethics be distinguished from the applied philosophy of ethics, that is, as applied to human nature. By this distinction of terms it at once appears that ethical principles are not based upon the peculiarities of human nature but that they must be existent by themselves *a priori*,—whence, for human nature, just as well as for *any* rational nature, practical rules can be derived."

Schleiermacher says:

"A good is any agreement ("unity") of definite sides [certain aspects] of reason and nature. * * * The end of ethical praxis is the highest good, *i. e.*, the sum of all unions of nature and reason. * * * The moral law may be compared to the algebraic formula which (in analytical geometry) determines the course [path] of a curve; the highest good may be compared to the curve itself, and virtue, or moral power, to an instrument arranged for the purpose of constructing the curve according to the formula." (Quoted from a translation of Ueberweg.)

Kant declares in other passages that in examples taken from practical life, it will be difficult to separate clearly and unmistakably the sense of duty as the real moral motive from other motives, inclinations, habits, etc. But such a distinction must be made, if the moral value of motives is to be considered *in abstracto*. This is necessary for a clear conception of the essential features of morality. Mr. Spencer has on other occasions highly praised the power of generalization, which indeed is fundamentally the same faculty, as thinking *in abstracto;* here, however, he does not follow

Kant's argument, but declares "that the assumed distinction between sense of duty and inclination is untenable." He says:

> "The very expression *sense* of duty implies that the mental "state signified is a feeling; and if a feeling it must, like other feel- "ings, be gratified by acts of one kind and offended by acts of an "opposite kind. If we take the name conscience, which is equiva- "lent to sense of duty, we see the same thing. The common ex- "pressions 'a tender conscience,' 'a seared conscience,' indicate the "perception that conscience is a feeling—a feeling which has its "satisfactions and dissatisfactions, and which *inclines* a man to acts "which yield the one and avoid the other—produces an *incli-* "*nation*," (p. 476).

It is quite true that every state of consciousness is a feeling, but we can and must discriminate between consciousness or feeling and the idea or thought which becomes conscious, in which the feeling appears, and which is, so to speak, the special form of a certain feeling. The consciousness and its special form, the feeling and the mental object of feeling, are in reality one and the same. Yet they are different and must *in abstracto* be well distinguished. Mr. Spencer's method is that of generalization, but generalizing can lead to no satisfactory results, if it is not constantly accompanied by discrimination. We must generalize and discriminate.

If a certain group of states of consciousness takes the form of a logical syllogism, it must not be expected that logic will find its explanation in feeling, although it cannot be denied that all the states of consciousness are feelings. Not the feeling in this case is to be explained, but logic. In our generalizations we must discriminate *in abstracto* between the feeling and the idea which feels. We must positively abstract from feeling and cannot consider whether the feeling of log-

ical arguments is pleasant or unpleasant. Mr. Spencer's method of explaining ethics, if applied to logic, would be as follows: "Man's logical sense is a very complex feeling and has developed from simple percepts such as can be observed in the lowest animals; percepts are a higher evolved form of reactions against irritations such as take place in protoplasm. The old method of explaining logic is that of deduction, modern logic will be inductive. Formerly pure logic was considered as a science *a priori*; but the evolution-philosophy shows that logic is developed by steps, it appears *a priori* to the individual now, but it is in reality a consolidated product of multitudinous experiences received mainly by ancestors and added to by self. Logical sense accordingly finds its explanation in most simple feelings. Our conceptions of logically incorrect feelings will be more and more avoided because they will ultimately be found to be unpleasant; logical correctness is striven for because of the feeling of satisfaction that accompanies the conception of a logically correct conclusion."

Sense is feeling, there can be no doubt. Logical sense and mathematical sense are feelings and if a person thinks a mathematical axiom or a logical syllogism or an ethical maxim, he has a feeling. Logical sense of reason is the product of evolution, and it cannot be denied either that one man has a more logical or mathematical or moral sense than another. But it does not follow that an explanation of mathematics, or logic, or ethics, must be derived from feeling pleasure and pain, or happiness. On the contrary we must abstract from feeling altogether and concern ourselves with the object of feeling only, which is the idea or the special form in which and as which feeling

appears. States of consciousness (never mind whether they are painful or pleasurable) must be considered as moral if their mental object, *i. e.*, the idea, the thought, the motive, the form in which feeling becomes manifest, is in harmony with the universal order of things.

* * *

Mr. Spencer declares that the world would be intolerable "if Kant's conception of moral worth were displayed universally in men's acts." And it must be acknowledged that Kant's ethics in their logical and irrefutable rigidity not only impressed the literary world of his time with the grandeur and sublimity of ethics; Kant's ethics also astounded, and overwhelmed his readers with awe. Virtue no longer appeared to be the fervid enthusiasm of sentiments; it congealed into the cold idea of duty which can be fixed in abstract rules and will operate like the correctly calculated gear of a machine. Objections have been raised by some of Kant's own disciples; but it must be known that the Kantian view of ethics does not suppress feelings, emotions and inclinations, it excludes them only from an estimation of the moral worth of actions. Kant gave the *coup de grace* to all sentimentality which had taken the lead in ethical questions too long. Mr. Spencer says:

"If those acts only have moral worth which are done from "a sense of duty * * * we must say that a man's moral "worth is greater in proportion as the strength of his sense of "duty is such that he does the right thing not only apart from "inclination but against inclination. According to Kant, then, "the most moral man is the man * * * who says of another "that which is true though he would like to injure him by a false-"hood; who lends money to his brother though he would prefer to "see him in distress."

Schiller, although an admirer of Kant, makes in

his Xenions a similar objection to this corollary of the ethics of pure reason. He says:

> "Willingly serve I my friends; but 'tis pity, I do it with pleasure.
> And I am really vexed, that there's no virtue in me!"

And he answers in a second distich:

> "There is no other advice than that you try to despise friends,
> And, with disgust, you will do what such a duty demands."

The difficulty is removed under the following consideration: A man with good inclinations is less exposed to temptation than a man with bad inclinations. If both act morally under conditions otherwise the same, the latter has shown greater strength of moral purpose than the former. The former's character (viz., his inherited inclinations and habits which represent the sum total of the moral energies of his ancestors,) is more moral than that of the latter. But the latter deserves more credit than the former for overcoming the temptation; he has in this special act shown more moral strength of will than his more fortunate and morally higher advanced fellow-man. To those who have accepted the Kantian view, Mr. Spencer's and Schiller's objection can serve as a warning, not to lose sight of emotions altogether. Man is not only a reasonable being, he is at the same time a feeling creature. The instinctive faculties of man, the so-called subconscious states, are the basis of his consciousness. They form the roots of his soul from which spring the clear conceptions of his reason. The more man's habits and inclinations agree with morals, the more strength of purpose is left for further ethical advancement and moral progress.

Similar objections have also been made to Kant's mechanical explanation of the origin of the planetary systems and milky ways. It seemed as if the divin-

ity of nature were replaced by the rigid law of gravity. In his poem "The God's of Greece," Schiller complains:

"Fühllos selbst für ihres Künstlers Ehre,
Gleich dem todten Schlag der Pendeluhr,
Dient sie knechtisch dem Gesetz der Schwere,
Die entgötterte Natur."

"Dead even to her Master's praise,
Like lifeless pendulum's vibration,
Lo, godless Nature now obeys,
Slave-like, the law of gravitation." *

Such objections are always raised when a scientific explanation destroys the mystic view that a spirit or at least something unexplainable is the supposed cause of certain phenomena. Our sentiments are so closely connected and intimately interwoven with our errors that truth appears hostile to sentiment, and it becomes difficult to part with errors sanctified by emotion. Sentimentality always complains that clear thought is an enemy of romanticism, and romanticism is the only possible poetry to the taste of the sentimental.

Now it cannot be denied that a one-sided knowledge not only appears rigid, it truly *is* so, and will be destructive of such emotions as reverence, awe, aesthetic taste, religion and art. Criticism is a most essential feature of science and philosophy, and how negative, how desolate and melancholy appear the results of criticism! But the pruning process of criticism is very wholesome, and true science will only profit by discarding the vagueness of indistinct conceptions. Alpine lakes that are really deep can only gain by lucidity. Thus the clearness of genuine science and broad philosophy will only show the depth of truth into which by all its lucidity our emotions can

* Slightly altered from B. W. BALL'S translation in THE OPEN COURT, p. 83.

plunge without ever finding it shallow or fathoming it in all its profundity.

Kant's doctrine of ethics is a truth that can stand the severest test.

Ethics, in the sense of the word as used by Kant, can be found in man only, in so far as he is a reasonable being. A truly reasonable being does not allow himself to be guided by impulses but is led by maxims. Inclinations and habits are remnants of instinct. Not he who in instinctive good-naturedness acts morally, is the ethical man, but he who deliberately and consciously considers himself a representative of the general order of things. The man, who adopts such maxims as can become universal principles, identifies his will with the laws of the universe. Man's moral dignity must not be sought in vague feelings or in instinctive inspirations; it is based upon his reason and is developed in so far only as he makes use of his reason.

KANT ON EVOLUTION.

IN CRITICISM OF MR. HERBERT SPENCER'S PRESENTATION OF KANTISM.

IT is very strange that Mr. Herbert Spencer will again and again attack the philosophy and ethics of Kant for views which Kant never held.* It is possible that there are disciples of Kant who deny the theory of evolution. Yet it is certain that Kant himself is not guilty of this mistake. Thinkers who reject the theory of evolution are in this respect as little entitled to call themselves disciples of Kant as, for instance, the Sadducees were to call themselves followers of Christ. Kantian philosophy was foremost in the recognition of the need of evolution, and that at a time when public interest was not as yet centered upon it.

Mr. Spencer's merits in the propagation of the theory of evolution are undeniable, and he deserves our warmest respect and thanks for the indefatigable zeal he has shown in the performance of this great work, for the labors he has undergone, and the sacrifices he has made for it. Yet recognising all that Mr. Spencer has done, we should not be blind to the fact that Kant's conception of evolution is even at the present day more in conformity with the facts of natural science than Mr. Spencer's philosophy, although the latter commonly goes by the name of the philosophy of evolution.

It is painful to note that in many places where Mr. Spencer refers to Kant's philosophy, he does it slightingly, as though Kant were one of the most irrational of thinkers. Kant's reasoning is denounced as "abnormal" and "vicious." I find such phrases as, "It

* See Mr. Spencer's article in *Mind*, No LIX, p. 313.

is a vice of Kant's philosophy . . . .," "If Kant had known more of Man than he did . . . .," etc. Mr. Spencer characterises Kant's method as follows:

> "Instead of setting out with a proposition of which the negative is inconceivable, it sets out with a proposition of which the affirmation is inconceivable, and proceeds to draw conclusions therefrom."

These attacks of Mr. Spencer on Kant are not justifiable. Kant is not guilty of the faults for which he is arraigned by Mr. Spencer.

* * *

It is, however, fair to state that these misunderstandings appear excusable if the difficulties are borne in mind with which the English student of Kant is confronted. First, Kant cannot be understood without taking into consideration the historical development of his philosophy, and, secondly, most translations of the fundamental terms, he employs, are so misleading that errors can scarcely be avoided.

Kant's philosophy is by no means a perfected system; it rather represents (as perhaps necessarily all philosophies do) the development of a thinker's mind. The "Critique of Pure Reason" especially shows traces of the state of Kant's mind at different periods, and thus it is that we discover passages which closely considered will be found to be contradictory. When reading this remarkable work we feel like travelers walking over the petrified relics of a powerful eruption. There are strata of ideas of the oldest formation close to the thoughts of a recent date. There are also vestiges of intermediate phases. Here they stand in the petrification of printed words, peacefully side by side,

as memorials of a great revolution in the development of human thought. It is this state of things which more than anything else makes of Kant's writings such difficult reading. At the same time it is obvious that we cannot simply take the results of Kant's philosophy; we must follow him in the paths by which he arrived at any given proposition.

There is no philosopher that has been worse misinterpreted than Kant; and the English interpreters of Kant have succeeded in mutilating his best thoughts so that this hero of progress appears as a stronghold of antiquated views. Mistranslations or misconceptions of his terms are to a great extent the cause of this singular fate. As an instance we mention the errors that attach to Kant's term *Anschauung*. *Anschauung* is the present object of our senses; it is the impression a man has from looking at a thing and might have been translated by "perception" or perhaps "sensation." It is usually translated by "intuition." The *Anschauung* of objects comprises the data of knowledge, and they are previous to our reflection upon them. An intuition in the sense of the English Intuitionalists is defined as "a presentation which can be given previously to all thought," yet this presentation is supposed to be a kind of revelation, a knowledge that comes to us without our contemplation, a cognition the character of which is immediate as well as mysterious; in short something that is supernatural.

How different is Kant's philosophy, for instance, if his position with reference to time and space is mistaken! "Time and Space are our *Anschauung*," Kant says. But his English translators declare: "Kant maintained that space and time are intuitions." What a difference it makes if intuition is interpreted in the

sense applied to it by the English Intuitionalist School instead of its being taken in the original meaning of the word *Anschauung*.

* * *

Any one who knows Kant through Mr. Spencer's representations only, must look upon him as having the most perverse mind that could possibly exist; and yet it is Kant from whom Spencer has indirectly derived the most characteristic feature of his philosophy. What is Mr. Spencer's agnosticism but a popularisation of Kant's view that things in themselves are unknowable?

We conclude from the animosity which Mr. Spencer shows toward Kant that he does not know how much in this respect he agrees with Kant, how much he has unconsciously imbibed from the *Zeitgeist* which in part was formed under the influence of this huge error of the great philosopher.

I feel confident that any clear thinker who studies Kant and arrives along with him at the "thing in itself" will soon free himself from this error of Kantian thought. Kant himself suggests to us the method by which we are to find the way out of agnosticism. As a proof I quote the views of two independent thinkers; both influenced by Kant's criticism but neither a blind follower. Professor Mach says:

> "I have always felt it as a special good fortune, that early in my life, at about the age of fifteen, I happened to find in the library of my father Kant's 'Prolegomena to Any Future Metaphysic.' The book made at that time a powerful, ineffaceable impression upon me that I never afterwards experienced to the same degree in any of my philosophical reading. Some two or three years later I suddenly discovered the superfluous rôle that 'the thing in itself' plays." *The Monist*, Vol. I, No. 1, pp. 65 and 66.

And Schiller guided by similar considerations says in one of his Xenions:

"Since Metaphysics, of late, without heirs to her fathers was gathered:
Under the hammer are now 'things in themselves' to be sold."

The latest attack of Mr. Spencer upon Kantism is in the article "Our Space-Consciousness," in *Mind*, written in reply to Professor Watson. Mr. Spencer there repeats his misconception of Kantism, so that I feel urged to utter a few words of protest against his gross misrepresentation of Kant's views. I shall confine myself mainly to quotations from Kant's works—and the passages quoted will speak for themselves. Should there indeed be any disciples of Kant who are, as Mr. Spencer says, "profoundly averse to that evolutionary view which contemplates mind as having had a genesis conforming to laws like those conformed to by the genesis of the body," these quotations will suffice to prove that they have misconstrued the views of their master. Philosophers hostile to the theory of evolution had better select another patron for their ideas. Kant is too radical a mind to protect those men who in the domains of thought give the signal for retreat.

Mr. Spencer adopted the evolution theory as it was presented by Von Baer, who explains "*Entwickelung*" as a progress from the homogeneous to the heterogeneous.

Baer's "Developmental History of Animals" was published in 1828. Mr. Spencer adopted the theory in 1854. But the history of the theory of evolution is older than Von Baer's book. Professor Baer concludes his work with a few corollaries among which near the end we find the following passage:

"If we survey the contents of the whole Scholia, there follows from them a general result. We found that the effect of generation continues to advance from a part to a whole [Schol. 2.]; that

in development, self-dependence increases in correspondence with its environment [Schol. 2.], as well as the determinateness of its structure [Schol. 1.]; that in the internal development special parts shape themselves forth from the more general, and their differentiation increases [Schol. 3.]; that the individual, as the possessor of a fixed organic form, changes by degrees from more general forms into more special [Schol. 5.].

"The general result of our inquiry and consideration can now well be declared as follows:

> "That the developmental history of the individual is the history of increasing individuality in every relation; that is, Individualisation.

"This general conclusion is, indeed, so plain, that it needs no proof from observation, but seems evident *a priori*. But we believe that this evidentness is merely the stamp of truth, and therefore is its guarantee. Had the history of development from the outset been perceived as just expressed, it could and should have been inferred, that the individual of a determinate animal type attains to this by changing from a general into a special form. But experience teaches everywhere, that deductions are always safer if their results are discovered beforehand by observation. Mankind would have obtained a still greater intellectual possession than it really has, had this been otherwise.

"But if this general conclusion has truth and contents, it is *one fundamental idea* which runs through all forms and degrees of animal development, and governs every single relation. It is the same idea that collected in space the distributed particles into spheres and united them in solar systems; which caused the disintegrated dust on the surface of our metallic planet to grow up into living forms; but this idea is nothing else than life itself, and the words and syllables in which it expresses itself, are the different forms of life."

These corollaries were not inserted by Baer because he intended to proclaim a new truth, but simply to excite a popular interest in a strictly scientific work, in order to extend the circle of its readers. Baer says in the preface:

"So much about the first part. In order to procure for the work readers and buyers, I have added a second part in which I

make some general remarks under the title of Scholia and Corollaries. They are intended to be sketches of the confession of my scientific faith concerning the development of animals, as it was formed from the observation of the chick and by other investigations."

* * *

The "Encyclopædia Britannica" says of Baer that he "prepared the way for Mr. Spencer's generalisation of the law of organic evolution as the law of all evolution."*

Baer declares that individualisation is "the one fundamental idea that goes through *all* the forms of cosmic and animal development." The generality of the law of evolution is clearer in the language employed by Baer, in the full context of the Scholia than appears from the short statement of the "Encyclopædia Britannica." Nevertheless it is clear enough in the quoted passage that Baer made a statement of universal application. How can such a universal statement be made more general?

We must add here that Mr. Spencer and his disciples overvalue the importance of generalisation. It is not the power of generalisation that makes the philosopher and the scientist but the power of discrimination. The habit of generalising whatever comes under our observation is very common among the uneducated and uncivilised, and almost nine tenths of human errors arise from unwarranted generalisations.

*The passage in the *Encyclopædia Britannica* on Baer runs as follows: "In his *Entwickelungsgeschichte der Thiere*, p. 264, he distinctly tells us that the law of growing individuality is 'the fundamental thought which goes through all forms and degrees of animal development and all single relations. It is the same thought which collected in the cosmic space solar systems; the same which caused the weather-beaten dust on the surface of our metallic planet to spring forth living beings.' Von Baer thus prepared the way for Mr. Spencer's generalisation of the law of organic evolution as the law of all evolution."

In Kant's time the interest in the theory of evolution was confined to a few minds. It is well known that Goethe was one of its most enthusiastic supporters.* In the middle of the eighteenth century there were three views proposed to explain the origin and the development of organised beings: (1) Occasionalism, (2) the theory of Evolution, and (3) the theory of Epigenesis. Occasionalism maintained that God created on each new occasion a new animal. The word evolution was used in a different sense from that in which it is now understood: evolutionism, as maintained by Bonnet, Haller, and others, was the view that the sperma contained a very small specimen of the animal that was to grow from it. The hen's egg was supposed to contain an excessively minute but complete chicken. The theory of epigenesis, however, propounded in 1759 by Caspar Friedrich Wolff in his "Theoria Generationis," explained development by additional growth, and it is this theory of epigenesis which later on, after the total defeat of the old evolutionism, was called (but improperly) the evolution theory. The word "evolution" has thus again admitted the erroneous idea of an unfolding.

In Kant's time the battle between the occasionalists, the evolutionists, and the adherents of the epigenesis theory was hot indeed; and Kant unquestionably gave preference to the epigenesis theory. The most important passage on the subject appears in his "Critique of Judgment." It is as follows:

"If now the teleological principle of the generation of organised beings be accepted, as it would be, we can account for their internally adapted form either by *Occasionalism* or by *Prestabilism.*†

* See Haeckel, *Goethe on Evolution*, No. 131 of *The Open Court*.

† *Præstabilismus*, that is, the theory that the phenomena of nature are the result of pre-established law.

According to the first, the supreme world-cause would, in agreement with its idea, on the occasion of every coition directly give the proper organic form to the material thereby blended; according to the second, it would have implanted into the original products of its designing wisdom merely the power by means of which an organic being produces its like and the species itself is constantly maintained and likewise the death of individuals is continually replaced by their own nature, which is operating at the same time for their destruction.

"If we assume occasionalism for the production of organised beings, nature is thereby wholly discarded, and with it the use of reasoning in determining the possibility of such kinds of products; therefore, it cannot be supposed that this system is accepted by any one who has had to do with philosophy."

"As to *Prestabilism*, it can proceed in a two-fold manner, namely, it considers every organic being produced by its like, either as the *educt* or as the *product* of the first. The system which considers generated beings as mere *educts* is called that of *individual preformation*, or also the *theory of evolution*; that which makes generated beings *products* is named the system of *epigenesis*. The latter can also be called a system of *generic preformation*, because the productive power of those generating was virtually preformed to agree with the internal adapted arrangements that fell to the lot of their race. The opposing theory to this view should be named that of individual preformation, or still better, the *theory of evolution*."

"The defenders of the theory of evolution, who exempt each individual from the formative power of nature, in order to derive the same directly from the hand of the Creator, would not dare to permit this to happen in accordance with the hypothesis of occasionalism, so that coition would be a mere formality, a supreme national world-cause having decided to form every particular fœtus by direct interference, and to resign to the mother only its development and nourishment. They declared themselves in favor of preformation, *as though it were not the same to make the required forms arise in a supernatural manner at the beginning of the world, as during its progress*; and as if a great multitude of supernatural arrangements would not rather be dispensed with through occasional creation which were necessary in order that the embryo formed at

the beginning of the world should, throughout the long period up to its development, not suffer from the destructive forces of nature, but endure and maintain itself intact; moreover, an immensely greater number of such preformed beings would be made than ever would be developed, and with them as many creations be thus rendered unnecessary and purposeless. They still, however, resign at least something to nature, in order not to fall in with complete hyperphysics, which can dispense with explanation from nature. They still held fast indeed, to their hyperphysics; even finding in monsters (which it must be impossible to regard as designs of nature) cases of adaptation which call for admiration, although the only purpose of that adaptedness might be to make an anatomist take offence at it as a purposeless adaptedness, and have a sense of melancholy admiration. Yet they could not well fit the generation of hybrids into the system of preformation, but were obliged still further to endow the sperm of male creatures with a designedly acting power, whereas they had otherwise accorded it nothing except mechanical force to serve as the first means of nourishment of the embryo; yet this designedly acting force, in the case of the products of generation between two creatures of the same kind, they would grant to neither of them.

"If on the contrary the great advantage was not at once recognised which the theory of epigenesis possessed over the former in view of the experimental foundation on which the proof of it rested; yet reason would be especially favorably predisposed from the outset for this mode of explanation, inasmuch as it regards nature—with reference to the things which originally can be conceived as possible only in accordance with the theory of causality and design, at least so far as propagation is concerned—as self-producing and not merely as developing, and thus with the least possible employment of the supernatural, leaves all that comes afterwards, from the very beginning on, to nature: without concerning itself with the original beginning, with regard to the explanation of which physics in general miscarries, try with what chain of causes it may."

Kant recognises neither the stability of species nor any fixed limits between them. And this one maxim alone suffices to prove that he was of the same opinion as the great biologist who wrote the "Origin of Species." Kant says (Ed. Hart. III. p. 444):

"*Non datur vacuum formarum*, that is, there are not different original and primitive species, which were, so to say, isolated and separated by an empty space from one another, but all the manifold species are only divisions of a single, chief, and general species; and from this principle results again this immediate inference: *datur continuum formarum*, that is, all differences of species border on each other, and allow no transition to one another by a leap, but only through very small degrees of difference, by which we can arrive at one from another; in one word, there are no species or sub-species which, according to reason, would be *next* each other in affinity, but intermediate species are always possible, whose difference from the first and second is less than their difference from one another."

In Kant's "Critique of Judgment" (§. 80) we find the following passage:

"The agreement of so many species of animals, with reference to a definite, common scheme, which appears not only to be at the foundation of their bony structure, but also of the arrangement of their other parts, in which, by abridgment of one and prolongation of another, by envelopment of this and unfolding of that, a wonderful simplicity of plan has been able to produce so great a diversity of species—this agreement casts a ray of hope, although a weak one, in the mind, that here, indeed, something might be accomplished with the principle of the mechanism of nature, without which in general there can be no physical science.

"This analogy of forms, so far as they appear, notwithstanding all their diversity, to be produced after the model of a common prototype, strengthens the conjecture of a real relationship between the same by generation from a common ancestral source, through the gradual approach of one animal species to another, from man, in whom the principle of design appears to be best proved, to the polyp, from this to the moss and lichen, and finally to the lowest stage of nature perceptible to us, to crude matter, from which and its forces, according to mechanical laws (like those which work in the production of crystals), the whole technic of na-

ture (which is so incomprehensible to us in organised beings that we imagine another principle is necessitated for their explanation) appears to be derived.*

"The Archæologist of nature is now free to make that great family of beings (for such we must conceive it, if the uninterrupted relationship is to have a foundation) arise out of the extant vestiges of the oldest revolutions, following every mechanism known to him or which he can suppose."

Kant adds in a foot-note:

"An hypothesis of such a kind can be named a daring venture of reason, and there may be few of the most sagacious naturalists, through whose minds it has not sometimes passed. For it is not absurd, as the *generatio equivoca*, by which is understood the production of an organised being through the mechanical action of crude unorganised matter. But it would still be *generatio vnivoca* in the common understanding of the word, in so far only as something organic was produced out of another organic body, although specifically distinguished from it; for instance, if certain aquatic animals by and by formed into amphibia, and from these after some generations into land animals. *A priori* this does not contradict the judgment of pure reason. Only experience shows no example thereof; according to it, rather, all generation which we know is *generatio homonyma* (not mere *univoca* in opposition to production out of unorganised material), that is, the bringing forth of a product homogeneous in organisation, with the generator; and *generatio heteronyma*, so far as our actual experience of nature goes is nowhere met with."

* The proposition that Kant is no easy reading found an unexpected and strong opposition. Immediately after the publication of this article, Sept. 4th, 1890, Mr. Charles S. Peirce made the following incidental remark in a letter to the author dated Sept. 6th, 1890: "I have heard too much of Kant's being hard reading. I think he is one of the easiest of philosophers; for he generally knows what he wants to say, which is more than half the battle, and he says it in terms which are very clear. Of course, it is quite absurd to try to read Kant without preliminary studies of Leibnizian and English philosophers, as well as of the terminology of which Kant's is a modification or transmogrification. But there is a way of making out what he meant, while such writers as Hume and J. S. Mill, the more you study them the more they puzzle you."

The treatise "Presumable Origin of Humanity," Kant sums up in the following sentence:

"From this representation of the earliest human history it results, that the departure of man from what, as the first abode of his kind, his judgment represented as Paradise, was no other than the transition of mere animal creatures out of barbarism into man, out of the leading-strings of instinct into the guidance of reason, in a word, out of the guardianship of nature into the state of freedom."

In his work "Upon the Different Races of Mankind," Kant discusses the origin of the species of man in a way which would do honor to a follower of Darwin. It is written in a spirit which recognises the difference of conditions as the causes that produce different species. We select a few passages from this work.

In a foot-note we read:

"Ordinarily we accept the terms natural science (*Naturbeschreibung*) and natural history in one and the same sense. But it is evident that the knowledge of natural phenomena, as they *now are*, always leaves to be desired the knowledge of that which they *have been* before now, and through what succession of modifications they have passed in order to have arrived, in every respect, at their present state. *Natural History*, which at present we almost entirely lack, would teach us the changes that have effected the form of the earth, likewise, the changes in the creatures of the earth (plants and animals) that they have suffered by natural transformations and, arising therefrom, the departures from the prototype of the original species that they have experienced. It would probably trace a great number of apparently different varieties back to a species of one and the same kind, and would convert the present so intricate school-system of Natural Science into a natural system in conformity with reason."

We adduce another passage, no less remarkable in clearness, which proves that Kant has a very definite idea, not only of the gradual evolution of man, but also of the survival of the fittest:

"The cry which a child scarcely born utters, has not the tone of misery, but of irritation, and violent rage; not the result of pain, but of vexation about something; probably for the reason that it wishes to move itself and feels its incapacity, like a captive when freedom is taken from him. What purpose can nature have in providing that a child shall come with a loud cry into the world, which for it and the mother is, in the *rude natural state*, full of danger? Since a wolf, a pig even, would in the absence of the mother, or through her feebleness owing to her delivery, be thus attracted to devour it. But no animal except man as he now is announces with noise its new-born existence; which in the wisdom of nature appears to be arranged *in order that the species shall be preserved.* We must also assume that in what was an early epoch of nature for this class of animals (namely in the period of barbarism) this outcry of the child at its birth did not exist; consequently only later on a second epoch appeared, after both parents had arrived at that degree of civilisation which was required for home-life;-yet without knowing how and by what interweaving causes nature arranges such a development. This remark leads us far; for example, to the thought whether after the same epoch, still a third did not follow accompanied by great natural revolutions, during which an orang-outang or a chimpanzee perfected the organs which serve for walking, for feeling objects, and for speech, and thus evolved the limb-structure of man; in which animals was contained an organ for the exercise of the function of reason, which by social cultivation was gradually perfected and developed."

Kant's view concerning the origin of the biped man from quadruped animal ancestors is most unequivocally stated.

In a review of Dr. Moscati's Lecture upon the difference of structure in animals and in men, Kant says:

"Dr. Moscati proves that the upright walk of man is constrained and unnatural; that he is indeed so constructed that he may be able to maintain and move in this position, but that, although by needful and constant habit he formed himself thus, inconvenience and disease arise therefrom, which sufficiently prove, that he was misled by reason and imitation to deviate from the first animal arrangement. Man is not constructed internally different from other

animals that go on all fours. When now he raises himself his intestines, particularly the embryo of pregnant individuals, come into a pendulous situation and a half reversed condition, which, if it often alternates with the lying position or that on all-fours, cannot precisely produce specially evil consequences, but, by constant continuance, causes deformities and numerous diseases. Thus, for example, the heart, because it is compelled to hang free, elongates the blood vessels to which it is attached, assumes an oblique position since it is supported by the diaphragm and slides with its end against the left side—a position wherein man, especially at full growth, differs from all other animals, and thereby receives an inevitable inclination to aneurism, palpitation, asthma, chest-dropsy, etc., etc. With the upright position of man the mesentery, pulled down by the weight of the intestines, sinks perpendicularly thereunder, is elongated and weakened, and prepared for numerous ruptures. In the mesenteric vein which has no valves, the blood moves slowly and with greater difficulty (it having to ascend against the course of gravity) than would happen with the horizontal position of the trunk. . . ."

"We could add considerably to the reasons just adduced to show that our animal nature is really quadrupedal. Among all four-footed animals there is not a single one that could not swim if it accidentally fell into the water. Man alone drowns, except in cases where he has learned to swim. The reason is because he has laid aside the habit of going on all-fours; for it is by this motion that he would keep himself up in the water without the exercise of any art, and by which all four-footed creatures, who otherwise shun the water, swim. . . ."

"It will be seen, accordingly, that the first care of nature was that man should be preserved as animal for *himself and his species*, and for that end the position best adapted to his internal structure, to the lay of the fœtus, and to his preservation in danger, was the quadrupedal position; we see, moreover, that a germ of reason is placed in him, whereby, after the development of the same, he is destined for *social intercourse*, and by the aid of which he assumes the position which is in every case the most fitted for this, namely, the bipedal position,—thus gaining upon the one hand infinite advantages over animals, but also being obliged to put up with many inconveniences that result from his holding his head so proudly above his old companions."

[* In the double-leaded quotation on pages 43 and 44 Kant speaks about the explanation of organised life from man down to the polyp "according to mechanical laws like those which work in the production of crystals," and he adds, in organised beings the whole technic of nature is so incomprehensible to us "that we imagine another principle is necessitated for their explanation."

This "other principle" would be the principle of design, or the teleological explanation of phenomena. In his old age Kant inclined more to teleology than in his younger years, and it is for this reason that Professor Ernst Haeckel accuses Kant of inconsistency.

After having pointed out that "Kant is one of the few philosophers that combine a well-founded knowledge of the natural sciences with extraordinary precision and depth of speculation" and further that "he was the first who taught 'the principle of the struggle for existence' and 'the theory of selection.'" Haeckel says in his "Natürliche Schöpfungsgeschichte," 8th edition, p. 91:

"Wir würden daher unbedingt in der Geschichte der Entwickelungslehre unserem gewaltigen Königsberger Philosophen den ersten Platz einräumen müssen, wenn nicht leider diese bewundernswürdigen monistischen Ideen des jungen Kant später durch den überwältigenden Einfluss der dualistisch christlichen Weltanschauung ganz zurückgedrängt worden wären."

This "influence of the dualistic Christian world-conception" is according to Haeckel, Kant's recognition of a teleological causation in the realm of organised life. Haeckel says on the same place:

"Er behauptet, dass sich im Gebiete der anorganischen Natur unbedingt sämmtliche Erscheinungen aus mechanischen Ursachen,

* This passage on pages 48, 49, and 50 which is enclosed in brackets did not appear in *The Open Court*. It has been added since and is published here for the first time.

aus bewegenden Kräften der Materie selbst, erklären lassen, im Gebiete der anorganischen Natur dagegen nicht."

Haeckel does not stand alone in denouncing the old Kant. Schopenhauer distinguishes between the author of the first and the author of the second edition of the "Critique of Pure Reason," regarding the former only as the real Kant. These accusations are not without foundation, but we believe with Max Müller that they have been unduly exaggerated.

As to teleology for which Kant's preference appears to be more strongly marked in his later than in his younger years we should say that it is a problem that should, in an historical investigation, as to whether or not Kant was a consistent evolutionist, be treated independently. No one can deny that there is an adaptation to ends in the domain of organised life. It is not so much required to deny teleology in the domain of organised nature as to purify and critically sift our views of teleology. There is a kind of teleology which does not stand in contradiction to the causation of efficient causes so called.

Mr. Spencer's denunciations of Kant would have some foundation, if he had reference to the old Kant alone. But everyone who censures Kant for the errors of his later period is bound to qualify his statement, and indeed whenever such strictures of Kantism appear I find them expressly stated as having reference to "the old Kant."

That Kant who is a living power even to-day is the young Kant, it is the author of the first edition of the "Critique of Pure Reason." He is generally called "the young Kant," although he was not young; he was, as we say, in his best years. The old Kant who proclaimed that he "must abolish knowledge in order

to make room for faith" is a dead weight in our colleges and universities. The young Kant is positive, the old Kant is agnostic. The young Kant was an investigator and naturalist of the first degree; he gave an impetus to investigation that it had never before received from philosophy. The old Kant, I should not exactly say reverted but certainly, neglected the principles of his younger years and thus became the leader of a reactionary movement from which sprang two offshoots very unlike each other but children of the same father; the Oxford transcendentalism as represented by Green and the English agnosticism as represented by Mr. Spencer.

It is strange that Mr. Spencer has so little knowledge concerning the evolution of the views he holds. If he were more familiar with the history of the idea "that the world-problem is insolvable, he would show more reverence toward the old Kant and his mystical inclinations; for Kant, whatever Mr. Spencer may say against it, is the father of modern agnosticism.*]

* * *

The history of Mr. Spencer's philosophical development shows that the first idea which took possession of his mind and formed the centre of crystalisation for all his later views was M. Condorcet's optimism. Condorcet believed in progress; he was convinced that in spite of all the tribulations and anxie-

* In this connection we call attention to a book, *Kant und Darwin, ein Beitrag zur Geschichte der Entwickelungslehre*, Jena, 1875, by Fritz Schultze, formerly Privat docent in Jena, now Professor of philosophy at the Polytechnic Institute in Dresden. This little book is a collection of the most important passages of Kant's views concerning evolution, the struggle for existence, and the theory of selection, and it is astonishing to find how much Kant had to say on the subject and how strongly he agrees with and anticipates Darwin. If Kant had not lived before Darwin one might be tempted to conclude that he was familiar with his *Origin of Species* and *The Descent of Man*.

ties of the present, man would at last arrive at a state of perfection. He saw a millennium in his prophetic mind, which alas!—if the law of evolution be true—can never be realised. Condorcet died a martyr to his ideals. He poisoned himself in 1799 to escape death by the Guillotine.

The influence of Condorcet's work *Esquisse d'un tableau historique des progrès de l'esprit humain* is traceable not only in Mr. Spencer's first book, "Social Statics," published in 1850, but in all his later writings. How can a true evolutionist believe in the Utopia of a state of perfect adaptation? Does not each progress demand new adaptations? Take as an instance the change from walking on four feet to an upright gait. Did not this progress itself involve man in new difficulties, to which he had to adapt himself? Let a labor-saving machine be invented, how many laborers lose their work and how many others are in demand! The transition from one state to the other is not easy, and as soon as it is perfected new wants have arisen which inexorably drive humanity onward on the infinite path of progress which can never be limited by any state of perfection. There is a constant readjustment necessary, and if we really could reach a state of perfect adaptation human life would drop into the unconsciousness of mere reflex motions.

Any one who understands the principle of evolution and its universal applicability, will recognise that there can be no standstill in the world, no state of perfect adaptation. Our solar system has evolved, as Kant explained in his "General Cosmogony and Theory of the Heavens," out of a nebula, and is going to dissolve again into a nebular state. So our social development consists in a constant realisation of ideals.

We may think that if we but attain our next and dearest ideal, humanity will be satisfied forever. But as soon as we have realised that ideal, we quickly get accustomed to its benefits. It becomes a matter of course and another ideal higher still than that just realised appears before our mental gaze.

Herder, in his "Ideas for a Philosophy of the History of Mankind," not unlike Mr. Spencer, was also under the spell of the Utopian ideal, that humanity will reach at last a state of perfect happiness. Kant, in his review of Herder's book, discusses the relativity of happiness and its insufficiency as a final aim of life. He says:

"First of all the happiness of an animal, then that of a child and of a youth, and lastly that of man! In all epochs of human history, as well as among all classes and conditions of the same epoch, that happiness has obtained which was in exact conformity with the individual's ideas and the degree of his habituation to the conditions amid which he was born and raised. Indeed, it is not even possible to form a comparison of the degree of happiness nor to give precedence to one class of men or to one generation over another. . . . If this shadow-picture of happiness . . . . were the actual aim of Providence, every man would have the measure of his own happiness within him. . . . Does the author (Herder) think perhaps that, if the happy inhabitants of Otaheiti had never been visited by more civilised peoples and were ordained to live in peaceful indolence for thousands of years to come—that we could give a satisfactory answer to the question why they should exist at all, and whether it would not have been just as well that this island should be occupied by happy sheep and cattle as that it should be inhabited by men who are happy only through pure enjoyment?"

"It involves no contradiction to say that no individual member of all the offspring of the human race, but that only the species, fully attains its mission (Bestimmung). The mathematician may explain the matter in his way. The philosopher would say: the mission of the human race as a whole is *unceasing progress*, and the perfection (Vollendung) of this mission is a mere idea (al-

though in every aspect a very useful one) of the aim towards which, in conformity with the design of providence, we are to direct our endeavors."

It is indubitable that Kant's views of evolution agree better with the present state of scientific investigation, than does Mr. Spencer's philosophy, which has never been freed from Condorcet's ingenuous optimism. The assumption of a final state of perfection by absolute adaptation is irreconcilable with the idea of unceasing progress, which must be true, if evolution is a universal law of nature.

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